TOWN OF DISCOVERY BAY
COMMUNITY SERVICES DISTRICT

RESOLUTION 2016-01

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TOWN OF DISCOVERY BAY, A CALIFORNIA COMMUNITY SERVICES DISTRICT, CERTIFYING THE 2010 URBAN WATER MANAGEMENT PLAN

WHEREAS, the Town of Discovery Bay Community Services District is a public agency in the state of California; and

WHEREAS, Pursuant to the Water Conservation Bill of 2009 SBX7-7 each urban water supplier that provides over 3,000 acre-feet of water annually, or serves more than 3,000 urban connections is required to assess the reliability of its water sources over the 20-year planning horizon, and

WHEREAS, the Town of Discovery Bay produces 3,000 acre-feet of water annually, and serves more than 3,000 urban connections and is therefore subject to the Bill, and

WHERAS, in 2010 the Town of Discovery Bay was in the midst of producing a long-range Water Master Plan (WMP), many of the components of which are necessary for the development of the Urban Water Management Plan (UWMP); and

WHEREAS, the WMP was completed in 2012, at which time the 2010 UWMP was scheduled for development, and

WHEREAS, the engineering firm of Luhdorff and Scalmanini Consulting Engineers (LSCE) was engaged to produce the UWMP on behalf of the Town; and

WHEREAS, LSCE has completed the UWMP and it is consistent with the California Department of Water Resources (DWR) requirements and those requirements identified in the Water Code, Sections §10608– 10656.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE TOWN OF DISCOVERY BAY COMMUNITY SERVICES DISTRICT DOES HEREBY RESOLVE AS FOLLOWS:

SECTION 1. That the Board of Directors of the Town of Discovery Bay certify that the Urban Water Management Plan is consistent with the California Department of Water Resources (DWR) requirements and those requirements identified in the Water Code, Sections §10608– 10656.

SECTION 2. That the UWMP is made a part of this Resolution.

SECTION 3. The Board Secretary shall certify the adoption of this Resolution.

PASSED, APPROVED AND ADOPTED THIS 6th DAY OF JANUARY, 2016

Bill Pease
Board President

I hereby certify that the foregoing Resolution was duly adopted by the Board of Directors of the Town of Discovery Bay Community Services District at a regularly scheduled meeting, held on January 6, 2016 by the following vote of the Board:

AYES: 4- President Pease, Vice President Laredo, Director Aitken, Director Steele
NOES: 0
ABSENT: 1- Director Simon
ABSTAIN: 0

Richard J. Howard
Board Secretary

2010 URBAN WATER MANAGEMENT PLAN

Town of Discovery Bay Community Services District

Prepared with Assistance From
Luhdorff & Scalmanini Consulting Engineers

September 22, 2015

Table of Contents

Page

Chapter 1 Plan Preparation 1-1
1.1 Introduction 1-1
1.2 Coordination 1-1
1.3 Plan Adoption, Submittal and Implementation 1-2

Chapter 2 System Description 2-1
2.1 Description of Service Area and Agency 2-1
2.2 Water System Description 2-1
2.2.1 Water Services 2-2
2.2.2 Water Supply Wells 2-2
2.2.3 Water Treatment Plants and Storage 2-3
2.2.4 Water Distribution 2-3
2.3 Climate 2-3
2.4 Service Area Population 2-4

Chapter 3 System Demand 3-1
3.1 Baseline Daily Per Capita Water Use 3-1
3.2 Water Use Targets 3-3
3.3 Historical Water Deliveries 3-4
3.4 Projected Water Deliveries 3-6
3.5 Low Income Residential Water Use 3-7
3.6 Wholesale Water Demand Projections 3-8
3.7 System Losses and Additional Water Uses 3-8
3.8 Total Water Use 3-9
3.9 Water Use Reduction Plan 3-10

Chapter 4 System Supplies 4-1
4.1 Water Sources 4-1
4.2 Groundwater 4-2
4.2.1 Geologic Setting and Occurrence of Groundwater 4-2
4.2.2 Hydrogeologic Setting in Discovery Bay 4-4
4.2.3 Groundwater Conditions 4-4
4.2.4 Well Yield and Aquifer Characteristics 4-6
4.2.5 Groundwater Basin Yield and Monitoring 4-7
4.3 Transfer Opportunities 4-7
4.4 Desalinated Water Opportunities 4-7
4.5 Recycled Water Opportunities 4-8

4.5.1 Wastewater Collection and Treatment System Description 4-8
4.5.2 Quantity of Available Treated Wastewater 4-9
4.5.3 Recycled Water Current and Potential Future Uses 4-9
4.5.4 Methods to Encourage Recycled Water Use 4-12
4.5 Future Water Projects 4-13

Chapter 5 Water Supply Reliability and Water Shortage Contingency Planning ... 5-1
5.1 Water Supply Reliability 5-1
5.2 Water Shortage Contingency Planning 5-1
5.2.1 Stages of Action 5-2
5.2.2 Prohibitions 5-3
5.2.3 Consumption Reduction Methods 5-4
5.2.4 Penalties 5-4
5.2.5 Revenue and Expenditure Impacts During Water Shortages 5-5
5.2.6 Other Actions During Catastrophic Reductions 5-5
5.3 Water Quality Impacts on Water Shortage 5-6
5.4 Drought Planning 5-7
5.4.1 Water Year Types 5-7
5.4.2 Three-Year Minimum Water Supply 5-8
5.4.3 Measurement for Determining Actual Consumption Reduction 5-8
5.4.4 Water Supply and Demand Assessment 5-9

Chapter 6 Demand Management Measures 6-1
6.1 Overview 6-1
6.2 Demand Management Measures Implementation 6-1

Appendices

Appendix A: UWMP Checklist

Appendix B: Notices to Agencies of Public Hearing, and Resolution to Adopt UWMP

Appendix C: Water Conservation Ordinances and Resolutions
C.1 – Water Shortage Contingency Resolution
C.2 – Resolution 2014-11 – Voluntary Water Reduction
C.3 – Ordinance No.25 – Establishing Emergency Drought Regulations

List of Tables

Tables

Table 1-1 (DWR Table 1) Coordination with appropriate agencies 1-2
Table 2-1 (DWR Table 2) Population – current and projected 2-5
Table 3-1 (DWR Table 13) Base period ranges 3-2
Table 3-2 (DWR Table 14) Base daily per capita water use – 10- to 15-year range 3-2
Table 3-3 (DWR Table 15) Base daily per capita water use – 5-year range 3-3
Table 3-4 Summary of Baseline Water Use and Targets 3-4
Table 3-5 (DWR Table 3) Water deliveries – actual / estimated, 2005 3-5
Table 3-6 (DWR Table 4) Water deliveries – actual / estimated, 2010 3-5
Table 3-7 Water deliveries – actual / estimated, 2014 3-5
Table 3-8 (DWR Table 5) Water deliveries – projected, 2015 3-6
Table 3-9 (DWR Table 6) Water deliveries – projected, 2020 3-7
Table 3-10 (DWR Table 7) Water deliveries – projected, 2020, 2030, 2035 3-7
Table 3-11 (DWR Table 8) Low-income projected water demands 3-8
Table 3-12 (DWR Table 9) Sales to other water agencies 3-8
Table 3-13 (DWR Table 10) Additional water uses and losses 3-9
Table 3-14 (DWR Table 11) Total water use 3-9
Table 4-1 Groundwater Supply Well Information 4-1
Table 4-2 (DWR Table 16) Water supplies – current and projected 4-2
Table 4-3 (DWR Table 18) Groundwater – volume pumped 4-6
Table 4-4 (DWR Table 19) Groundwater – volume projected to be pumped 4-7
Table 4-5 (DWR Table 21) Current and projected wastewater flows 4-9
Table 4-6 (DWR Table 22) Recycled water – non-recycled wastewater disposal 4-9
Table 4-7 (DWR Table 23) Recycled water – potential future use 4-12
Table 4-8 (DWR Table 26) Future water supply projects 4-13
Table 5-1 (DWR Table 35) Water shortage contingency – rationing stages 5-3
Table 5-2 (DWR Table 36) Water shortage contingency – mandatory prohibitions 5-3
Table 5-3 (DWR Table 37) Water shortage contingency – consumption reduction methods 5-4
Table 5-4 (DWR Table 38) Water shortage contingency – penalties and charges 5-5
Table 5-5 (DWR Table 30) water quality impacts 5-6
Table 5-6 (DWR Table 27) Basis of water year data 5-7
Table 5-7 (DWR Table 28) Supply reliability – historic conditions 5-8
Table 5-8 (DWR Table 31) Supply reliability – current water sources 5-8
Table 5-9 (DWR Table 32) Supply and demand comparison, normal year 5-9
Table 5-10 (DWR Table 33) Supply and demand comparison, single dry-year events 5-9
Table 5-11 (DWR Table 34) Supply and demand comparison, multiple dry-year events 5-10
Table 6-1 Demand Management Measures 6-2

List of Figures

Figures

Figure 2-1 Existing Water System and Future Developments
Figure 2-2 Population Growth
Figure 4-1 Geologic Cross-Section
Figure 4-2 Hydrograph of Supply Wells
Figure 4-3 TDS of Supply Wells

List of Abbreviations

CUWCC	California Urban Water Conservation Council
CWC	California Water Code
CDP	census designated place
DMM	demand management measure
DWR	Department of Water Resources
EDU	equivalent dwelling unit
gpcd	gallons per capita per day
gpm	gallons per minutes
gpm/ft	gallons per minute per foot of drawdown
µS/cm	micro-Siemens per centimeter
MCL	maximum contaminant level
MGD	million gallons per day
MGY	million gallons per year
MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
NPDES	National Pollutant Discharge Elimination System
RWQCB	Regional Water Quality Control Board
SBX7-7	Senate Bill SBX7-7, Water Conservation Bill of 2009
TDS	total dissolved solids
TODB	Town of Discovery Bay Community Services District
UV	ultraviolet
UWMP	Urban Water Management Plan
WDR	waste discharge requirements
WTP	water treatment plant
WWTP	wastewater treatment plant
WRCC	Western Regional Climate Center

Chapter 1 Plan Preparation

This chapter introduces the 2010 Urban Water Management Plan for the Town of Discovery Bay Community Services District (TODB) and describes the plan preparation process that included coordination with the public, plan adoption, submittal and implementation.

1.1 Introduction

Urban Water Management Plans (UWMPs) are State-mandated water supply planning documents required by the Department of Water Resources (DWR) to be completed every 5 years by every urban water supplier that has 3,000 or more service connections or supplying 3,000 or more acre-feet of water per year. The Town of Discovery Bay Community Services District prepared this 2010 UWMP to comply with the *UWMP Act (California Water Code Section 10610 et seq.)* and the *Water Conservation Bill of 2009 (SBX7-7).* The California Department of Water Resources prepared a *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban water Management Plan* (Guidebook), which was utilized to ensure this 2010 UWMP complies with the state legislative requirements. Appendix A provides a completed UWMP Checklist per the Guidebook.

The purpose of the UWMP is to direct long-term resource planning to ensure adequate water supplies meet existing and future demands over a 20-year planning horizon and under various drought and water shortage scenarios. Furthermore, with goals set forth in the *Water Conservation Bill of 2009* to reduce urban per-capita water use by 20% by 2020, each urban water supplier must include targets for water supply reduction in the 2010 UWMP. Specifically, the 2010 UWMP must define the urban water supplier's base daily per-capita water use and set water use targets reduction for 2015 and 2020. The 2010 UWMP must also include an evaluation of population growth; water deliveries and uses; water supply sources; efficient water uses, and; water demand management measures (DMMs) with implementation strategy and schedule.

The 2010 UWMPs were due July 1, 2011. TODB is submitting this plan retroactively in order define its base water use and water use targets to comply with the requirements of the State legislature. This 2010 UWMP includes data up to 2014. Finally, as TODB did not submit a 2005 UWMP, this 2010 UWMP was prepared as a new submittal rather than an update.

1.2 Coordination and Public Hearing

California Water Code (CWC) Section 10620(d)(2) requires the urban water supplier to coordinate the preparation of the UWMP with other appropriate agencies in the area to the extent practicable. Furthermore, CWC Section 10642 requires the water supplier to make the Plan

available for public inspection and hold a public hearing. The hearing should include specific discussion of the plan with regard to the present and proposed future measures, programs, and policies to help achieve the water use reductions and to publicly discuss the water suppliers per capita water use reduction goals.

In accordance with the code requirements, TODB will schedule a public hearing to review, consider any changes to, and adopt the 2010 UWMP. At least 60 days prior to the public hearing to review and adopt the UWMP, TODB will notify nearby applicable agencies of the intent to adopt the 2010 UWMP.

Table 1-1 summarizes the coordination effort involved with preparing the TODB 2010 UWMP (as recommended in the DWR Guidelines).

Table 1-1 (DWR Table 1)
Coordination with appropriate agencies

Coordinating Agencies[1,2]	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Not involved / No information
Contra Costa Water District					X	X	
East Contra Costa Irrigation District					X	X	
City of Antioch					X	X	
City of Brentwood					X	X	
Diablo Water District					X	X	
Contra Costa County					X	X	
General Public			X		X	X	

[1] Indicate the specific name of the agency with which coordination or outreach occurred.

[2] Check at least one box in each row.

1.3 Plan Adoption, Submittal and Implementation Process

The DWR Guidebook includes a description of the requirements for public participation and Plan adoption. The requirements include the following:

- At least 60 days prior to the public hearing, water suppliers must notify any city or county within which the supplier provides water supplies that the supplier is in the process of preparing their Plan.

- Water suppliers must encourage the involvement of diverse social, cultural, and economic elements of the population within the service area.

- Water suppliers must make the UWMP available for public inspection prior to adoption. Prior to the public hearing, the water supplier must provide public notification of the time and place for the hearing. The water supplier must provide such notification in two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates.

- If a water supplier makes changes to the UWMP after plan adoption, the supplier must hold another public hearing and have the UWMP readopted.

- A copy of the UWMP adoption resolution must be included in the UWMP.

- The water supplier must provide information on how it will implement the UWMP.

- No later than 30 days after submitting a UWMP to DWR, water suppliers must provide a copy of the UWMP to the California State Library and any city or county within which the supplier provides water supplies and must make the UWMP available for public review during normal business hours

For this 2010 UWMP, TODB will notify applicable agencies listed in Table 1-1, at least 60 days in advance, that a public hearing will be held to review and consider any changes to the draft 2010 UWMP. TODB intends to adopt this 2010 UWMP following the public hearing. The final 2010 UWMP will include a copy of the Public Hearing and Board resolution in Appendix B (to be included after the public hearing and adoption).

TODB will post the notice of the public hearing on the TODB homepage on the internet, as well as legal public notices in the newspaper. Copies of the 2010 UWMP will be available at the TODB offices.

The public hearing will be used to discuss the present and proposed future measures, programs, and policies in the UWMP to help achieve the water use reductions and publically discuss the per-capita water use reduction goals.

Once the 2010 UWMP is adopted, the Plan will be implemented. In general, the implementation of the elements of this Plan involves continued water supply monitoring (groundwater levels and quality); monitoring of water demand; enacting water shortage contingency plans when necessary in response to water shortages, and; implementing water conservation and tracking demand reduction through the strategies and schedules described for DMMs.

Chapter 2 System Description

2.1 Description of Service Area and Agency

The Town of Discovery Bay is located adjacent to the Sacramento-San Joaquin Delta (Delta) and is approximately twenty miles due west of the city of Stockton and six miles southeast of the city of Brentwood off State Highway 4. The Town of Discovery Bay is a largely residential community with limited commercial development constructed within a network of man-made lakes and channels that are connected to the Delta. The levees and waterways of Discovery Bay are managed and maintained by Reclamation District 800, the California Department of Boating and Waterways, and the US Army Corps of Engineers. The system is defined by relatively flat topographies with mean sea level elevations ranging from 5 feet to 15 feet across the entire system.

The Town of Discovery Bay is an unincorporated community that operates as a Community Services District which is governed by a 5-member elected Board of Directors that was formed in 1997. Prior to the formation of the Community Services District, the developments were privately owned and the water system was managed by the Sanitation District No. 19. The first developments in the Town of Discovery Bay were constructed in the early 1970's as a resort community. Today, the Town is primarily a year-around community with approximately 14,600 residents.

The Discovery Bay Community Services District (TODB) serves as Town of Discovery Bay's local government tasked with providing and maintaining the municipal public water (water supply, treatment and distribution) and wastewater systems (collection, transmission and treatment) to approximately 5,800 homes and businesses. TODB also manages the Town's common landscaping and recreation zones. TODB Board has no land-use or zoning authority; however, TODB advises the County of Contra Costa on decisions related to municipal services not provided by the TODB.

2.2 Water System Description

TODB public water system derives 100% of its water supply from five active groundwater supply wells. A sixth ground water well is currently under construction. Raw water from the wells is delivered and treated at two water treatment plants (WTPs), known as Newport WTP and the Willow Lake WTP. Storage tanks are located at each plant to provide operational equalization and reserves for fire safety. Booster facilities draw upon the storage tanks to provide the flow and pressure required in the interconnected distribution system. Each water treatment plant is equipped with standby generators to operate the facilities in the event of prolonged

power outages. The distribution system consists of a network of piping that varies in material, age and sizes ranging in diameter from 6-inch through 20-inch. The system operates as one pressure zone.

Figure 2-1 provides a map of the water system including service area boundary, water supply sources, water treatment plants and distribution piping. Details of the water system are discussed below.

2.2.1 Water Services

Discovery Bay is predominately a residential community, with some commercial, institutional and irrigation water uses. There is no industrial water use. Through 2014, TODB serves potable drinking water to approximately 14,608 people via approximately 5,842 service connections. Of those, 5,683 are residential services, 28 are commercial and institutional, and 98 are landscape irrigation (e.g. parks, greenbelts, etc.) and 33 designated as "other". The "other" services are for drip systems along sidewalks and driveways to control soil moisture and the shrinkage and swelling of clay soils.

TODB prepared a 2010 Water Master Plan[1] that covered a ten year planning horizon. It was assumed that growth in that period would be driven by housing development plans from local developers. There was also minor infill of vacant undeveloped lots within existing neighborhoods. TODB defined the areas of growth and provided the estimated schedule for completion based on input from the developers. The future developments would build-out the existing service area boundary with some growth planned to occur outside the existing service area boundary.

The 2010 Water Master Plan projected a growth of 1,385 service connections by the year 2020. In preparing this UWMP, TODB provided updates to the historical number of service connections reported in the 2010 Water Master Plan. Based on those updates, TODB had 5,842 total service connections in 2010, and will have 7,230 total service connections by 2020.

2.2.2 Water Supply Wells

The five active groundwater supply wells deliver groundwater to the treatment plants through dedicated raw water pipelines (Wells 1B, 2, 4A, 5A and 6). Wells 1B, 2 and 6 deliver water to Willow Lake WTP, and Wells 4A and 5A deliver water to the Newport WTP. Well 2 is the oldest active well, constructed in 1971. Wells 1B, 4A and 5A were constructed between 1991 and 1996. Well 6 is the newest well, constructed in 2009. A sixth well (Well 7) will be brought online in 2015.

[1] 2012, Luhdorff & Scalmanini Consulting Engineers, Discovery Bay 2010 Water Master Plan

The capacity of all existing wells combined is approximately 7,900 gallons per minute (gpm). After Well 7 is brought online, the combined well capacity will be approximately 9,900 gpm. As presented in the 2010 Water Master Plan, Well 7 is being constructed per TODB's Capital Improvement Plan as a backup supply well to meet current and future water demands with the largest producing supply well offline.

2.2.3 Water Treatment Plants and Storage

In the early 2000s, TODB constructed two centralized water treatment facilities for removal of iron and manganese in the groundwater. The facilities are known as the Willow Lake Water Treatment Plant (WTP) and Newport WTP. The treatment process is the same at both plants. Raw water is chemically oxidized and filtered through manganese-greens and media filters, and treated water stored in onsite reservoirs. Booster pumping stations draw from the reservoirs to maintain a pressurized water distribution system. Each treatment plant is equipped with a 750-kilowatt, diesel-powered backup generator, which can provide power to the entire treatment plant in the event of power outages.

The combined treatment capacity of both water treatment plants is 6,550 gpm. The combined storage capacity of the system is 2 million gallons. A new 850 gpm filter will be added to the Willow Lake WTP and an additional 0.275 million gallons will be added at Newport WTP per TODB's Capital Improvement Plan in order to meet water demands projected to 2020.

2.2.4 Water Distribution

The distribution system has approximately 46 miles of mainline piping ranging in size from 6-inch to 16-inch. A majority of the system is 8-inch pipe, with 12-inch and 16-inch arterial mains. The system contains approximately 18 miles of asbestos cement (AC) pipe, 28 miles of PVC pipe, and about 1 mile of cast iron and ductile iron pipe. The 2010 Water Master Plan indicated that future subdivisions would add approximately 6.5 miles of pipeline to the system.

2.3 Climate

The climate in Discovery Bay consists of cool and humid winters and hot and dry summers, characteristic of the areas surrounding the Sacramento-San Joaquin River Delta. Though climate data is not recorded in Discovery Bay, historic climate data sets are available for nearby cities. The City of Antioch, located approximately 20 miles northwest of Discovery Bay, has temperature records from 1955 on the Western Regional Climate Center (WRCC)[2] website.

[2] Western Regional Climate Center website, Cooperative Climatological Data Summaries, NOAA Cooperative Stations, Antioch Pump Plant 3, California: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0232

Average temperatures range from 37 to 91 ^{o}F, but the extreme low and high temperatures have been 18 and 117 ^{o}F, respectively. The rainy season typically starts in November and ends in March, with some rain events occurring as early as September or as late as May. During the rainy season, average monthly precipitation is about 2 to 3 inches, and monthly precipitation has ranged from 0 to 9 inches. Average annual precipitation is 13 inches, and a maximum of 28 inches.

High water demand for TODB is correlated with the hot and dry summers. Private landscape irrigation, including lawn irrigation, is a significant component of the higher summer water demands. Additionally, there is an unquantified vacation and tourist population that rises during the summer for recreation. Water demands are lowest during the winter months.

2.4 Service Area Population

The service area population methods presented in the DWR Guidelines[3] were applied to estimate TODB's service area population. The service area population estimates below are used in calculating the baseline per capita water use (see Chapter 3).

US Census Bureau (census) data was used as the basis for population estimates. The census identifies Discovery Bay as a "census designated place" (CDP), which is a term for populated areas that resemble incorporated places but are not incorporated under the laws of the state. The Census Block Map for Discovery Bay CDP overlaps the TODB Service Area Boundary. Accordingly, TODB falls into Category 1 of the DWR Guidelines, where the actual distribution area overlaps more than 95-percent with the Census Block Map estimates for the community. Therefore, the census data for Discovery Bay CDP is directly used to determine service area population of TODB during baseline compliance years.

The population estimates are based primarily on two information sources: 1) the census data; and 2) the number of homes added since 2010. The 2000 and 2010 census reports show TODB had a population of 8,981 and 13,352, respectively. The census also shows the number of households, total housing units and persons-per-household connection. US Census defines population and households as people that are counted at their "usual residence", which is defined as the place where the person lives and sleeps most of the time. In 2010, there were 4,742 households with 2.74 persons-per-household, and 5,403 total housing units. Based on this data, there were 661 housing units not considered regular houses used as "usual residences".

The TODB observes a transient population associated with local outdoor water and other recreational activities. The estimated number of houses used for vacation purposes is also based

[3] 2011, Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan, Department of Water Resources

on the census data. The difference between total household units and households reported in the census represents house that are not used as usual residences, and for these purposes are assumed to represent the vacation home use (i.e. there were approximately 661 vacation households in TODB in 2010). It is assumed that these homes are occupied 25-percent of the time at 2.74 persons-per-household. This equates to approximately 453 people in the transient population. Adding this to the live-in resident population in 2010 results in a total 2010 population of 13,805.

Since 2010, new houses have been added. It is observed that these homes are typically occupied by live-in residences (i.e. not vacation housing). For each home added, it is assumed the population increases by 2.74 people. From 2010 to 2020 it is projected there will be 1,355 homes added. This is based on the build-out of the existing service area identified in the 2010 Water Master Plan. The population by 2020 is estimated to be 18,323 using the growth of homes and the 2010 basis.

Local considerations were made to assess growth beyond the 2020 build-out. There are other potential lands surrounding the TODB that developers have shown interest in. The County of Contra Costa General Plan[4] has identified a need for additional housing in the unincorporated areas of East Contra Costa County. However, the only available lands are in ecologically sensitive areas (e.g., in several feet of peat, marinas, and waterways). Based on the time it has taken current developments to undergo environmental, permitting and public review, and based on economic considerations, TODB forecasts that any additional housing beyond 2020 would not result in new housing being occupied until 2030 at the earliest.

Accordingly, the population estimates in this plan forecast a lull between 2020 and 2030, to account for the planning time required for any future developments. Beginning in 2030 it is assumed that future housing projects will have been completed, and service area population will continue to grow at the historic average annual growth rate of 4-percent for TODB.

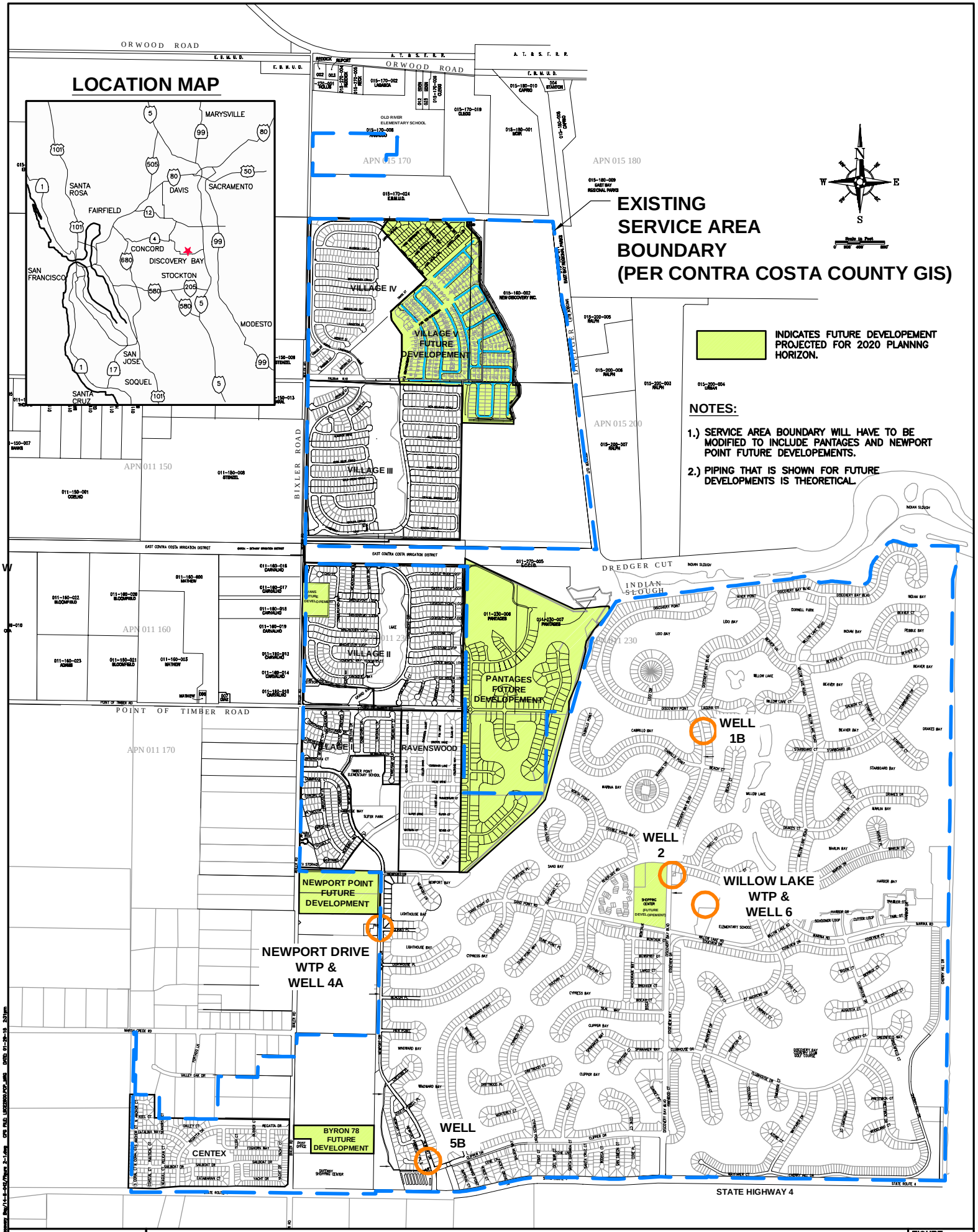
The population growth of TODB to 2035 is shown in Figure 2-2 (see end of chapter) and in Table 2-1, below.

Table 2-1 (DWR Table 2)
Population — current and projected

	2010	2014	2015	2020	2025	2030	2035	Data source
Service area population[1]	13,805	14,608	15,227	18,323	18,323	18,323	22,100	See Note 2

[1] Service area population is defined as the population served by the distribution system.
[2] U.S. Census Bureau 2000 and 2010, and TODB service connection estimates

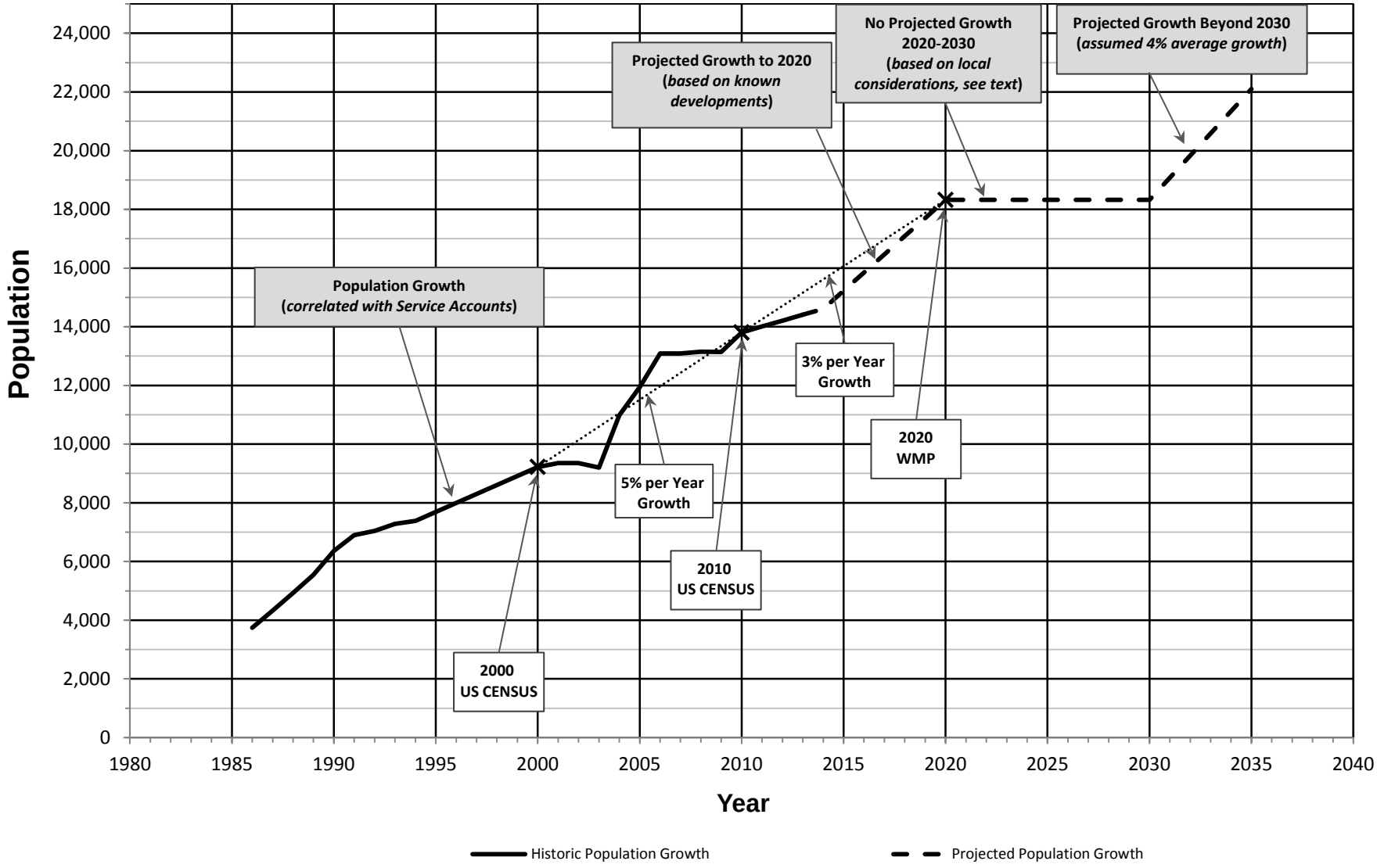
[4] 2013, Contra Costa County General Plan 2020 Update



LUHDORFF & SCALMANINI CONSULTING ENGINEERS

2010 URBAN WATER MANAGEMENT PLAN
EXISTING WATER SYSTEM AND FUTURE DEVELOPMENTS
DISCOVERY BAY, CALIFORNIA

FIGURE:
2-1



LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Figure 2-2
Population Growth
Discovery Bay CSD

Chapter 3 System Demands

Chapter 3 provides the baseline water use, water reduction goals, and projected water use in accordance with the UWMP Act and the Water Conservation Bill of 2009 (SBX7-7).

3.1 Baseline Daily Per Capita Water Use

As stated in the Water Conservation Bill of 2009, Senate Bill SBX7-7 (SBX7-7), an urban retail water supplier shall include in its 2010 Urban Water Management Plan the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use. The plan should include the basis for determining those estimates and references to supporting data.

Baseline water use and targets were determined using *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*[5], developed by DWR for consistent implementation of SBX7-7. The baseline and target water use presented in this chapter were developed individually by TODB, not regionally with other agencies.

The baseline daily per-capita water use (i.e. baseline water use) serves as the basis for setting the target water use reduction goals by 2015 and 2020. To establish baseline water use, water suppliers must define a 10 year or 15 year base (i.e., baseline) period for water use. The 15-year baseline period applies to a water supplier that met at least 10 percent of its 2008 retail water demand through recycled water, which TODB did not and therefore a 10-year base applies to TODB. Table 3-1, below, summarizes the baseline periods for TODB.

Calculation of the baseline water use is based on the estimated service area population and the gross water use for each year in the base period. Chapter 2 provided estimates of the service area population. Gross water use was identified using TODB production records from its water production facilities. The water system, as described in Chapter 2, consists of two central water treatment plants that receive raw water from groundwater supply wells. The system does not have imported water nor does it provide wholesale water. Historically, the system has not used recycled water; however, a recent project will be adding recycled water use into the system for industrial purposes. Therefore, historical records of water production from the water treatment plants represent the gross water use of the system.

[5] February 2011, Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use, California Department of Water Resources

Table 3-1 (DWR Table 13) Base period ranges			
Base	**Parameter**	**Value**	**Units**
10- to 15-year base period	2008 total water deliveries	1,328	*MGY*
	2008 total volume of delivered recycled water	0	*MGY*
	2008 recycled water as a percent of total deliveries	0	percent
	Number of years in base period[1]	10	years
	Year beginning base period range	2001	
	Year ending base period range[2]	2010	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range[3]	2007	

[1]If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first base period is a continuous 10- to 15-year period.

[2]The ending year must be between December 31, 2004 and December 31, 2010.

[2]The ending year must be between December 31, 2007 and December 31, 2010.

The historical records of gross water use and service area population are shown in Table 3-2. The daily per-capita water use is calculated for each baseline year. The baseline daily per capita water use was calculated using the average of the per-capita water use for each baseline year, and is approximately 263 gallons per capita per day (gpcd). Table 3-2, below, summarizes the service area population, gross water use, the calculated daily per capita water use for each baseline year, and the baseline daily per capita water use. Units are expressed in million gallons per day (mgd) and gallons per capita per day (gpcd).

Table 3-2 (DWR Table 14) Base daily per capita water use — 10- to 15-year range				
Base period year		**Distribution System Population**	**Daily system gross water use (mgd)**	**Annual daily per capita water use (gpcd)**
Sequence Year	**Calendar Year**			
Year 1	2001	9,357	2.2411	240
Year 2	2002	9,357	2.3315	249
Year 3	2003	9,200	2.5233	274
Year 4	2004	10,982	2.8356	258
Year 5	2005	11,947	3.2986	276
Year 6	2006	13,085	3.2466	248
Year 7	2007	13,090	3.6219	277
Year 8	2008	13,147	3.6384	277
Year 9	2009	13,138	3.5123	267
Year 10	2010	13,805	3.5781	259
Baseline Daily Per Capita Water Use[1]				**263**

3.2 Water Use Targets

Each water supplier must establish a water use reduction target for 2020, referred to as the urban water use target. There are four methods available to water suppliers for determining the urban water use target.

- Method 1: 80% pf Baseline Daily Per Capita Water Use
- Method 2: Performance Standards
- Method 3: 95% of Regional Target
- Method 4: Water Savings (provisional)

Due to lower regional targets, and predominant residential uses in TODB, Method 1 was selected as the most appropriate. The target is set equal to 80-percent of the baseline water use. Using this method, the urban water use target is 210 gpcd by the year 2020 (i.e., a 20-percent reduction in 10 years).

In accordance with SBX7-7, water suppliers must confirm that the 2020 water use target meets the legislation's minimum water use reduction requirements by comparing the water use target determined above (210 gpcd) to the calculated water use for a 5-year baseline period, determined as follows. Table 3-3, below, summarizes the daily per-capita water use in the 5-year base period. Following the DWR guidelines, the minimum required reduction in water use is calculated as 95-percent of the 5-year base water use, which is approximately 251 gpcd. The water use target (210 gpcd) is less than the minimum required (251 gpcd), and therefore no adjustment is needed to the water use target.

Table 3-3 (DWR Table 15)
Base daily per capita water use — 5-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	9,447	2.5233	267
Year 2	2004	11,125	2.8356	255
Year 3	2005	12,034	3.2986	274
Year 4	2006	13,106	3.2466	248
Year 5	2007	13,110	3.6219	276
Baseline Daily Per Capita Water Use[1]				**264**

[1]Add the values in the column and divide by the number of rows.

Finally, water suppliers must set an interim water use target to achieve by 2015, which will be reported and verified in the 2015 UWMP. The interim water use target is used to demonstrate progress being made toward achieving water reduction goals. The interim water use target by 2015 is calculated as the average of the baseline water use and the water use target, which is approximately 236 gpcd. Table 3-4 summarizes the DBCD baseline water use, water use target and interim water use target.

Table 3-4: Summary of Baseline Water Use and Targets

Water Use Baseline and Targets	Baseline (2000-2010)	Interim Water Use Target (2015)	Water Use Target (2020)
Daily Per Capita Water Use (gpcd)	263	236	210

3.3 Historical Water Deliveries

In preparing a UWMP, water suppliers must quantify, to the extent records are available, past and current water use and projected water use, identifying the uses among water use sectors. There are three main sources of data that were used to identify the water use in each sector for TODB. The first source is annual reporting by TODB to DWR and CDPH. The second source is the TODB 2010 Water Master Plan. The third source is recent updates from TODB, which, in preparation of this document, provided corrections to the number of service connections reported in the 2010 Water Master Plan. The data reported in this 2010 UWMP also include the most recent year of data (2014) so that the document is "current" with the date of submittal.

Tables 3-5, 3-6 and 3-7 below provide the estimated number of service connections and water use in each sector for the years 2005, 2010 and 2014. The deliveries in each year are broken into metered and non-metered. TODB categorizes customer sectors as follows: single family residential, multi-family residential, commercial/institutional, landscape, and other. The water deliveries do not account for water system losses and other water uses, which are discussed in Section 3.7.

Ninety eight percent of all services in the TODB system are residential. In 2005, a majority of the system was non-metered and residents were billed on a flat-rate system. TODB started adding customer meters on residential services in 2008. As of 2009, approximately 30-percent of all residential services were metered. TODB intends to become fully metered by the conclusion of Fiscal 2017-18 in order to provide the basic tool for tracking water demand and demand management effectiveness, and also to comply with State requirements to be fully metered not later than January 1, 2025.

For the purposes of reporting non-metered water deliveries, estimates were made based off of metered customer water data in each customer sector, respectively. Tables 3-5, 3-6 and 3-7 provide estimates of the metered and non-metered water deliveries for years 2005, 2010 and 2014, respectively. Water Demand dramatically decreases in 2014 in response to emergency drought regulations issued to residents by the State and TODB.

Table 3-5 (DWR Table 3)
Water deliveries — actual / estimated, 2005

	2005				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume (MGY)	# of accounts	Volume (MGY)	Volume (MGY)
Single family	0	0	5,300	910	910
Multi-family	0	0	0	0	0
Commercial Institutional	14	9	10	7	16
Landscape	29	91	17	53	145
Other	7	0	0	0	0
Total	50	100	5,327	970	1,070

Table 3-6 (DWR Table 4)
Water deliveries — actual / estimated, 2010

	2010				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume (MGY)	# of accounts	Volume (MGY)	Volume (MGY)
Single family	1,878	312	3,580	615	927
Multi-family	0	0	224	29	29
Commercial Institutional	30	21	3	2	23
Landscape	72	103	24	34	138
Other	8	1	62	7	8
Total	1,988	437	3,893	687	1,124

Table 3-7
Water deliveries — actual / estimated, 2014

	2014				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume (MGY)	# of accounts	Volume (MGY)	Volume (MGY)
Single family	2,171	418	3,295	368	786
Multi-family	0	0	224	29	29
Commercial Institutional	35	42	21	25	68
Landscape	86	192	10	22	214
Other	0	0	0	0	0
Total	2,292	652	3,550	444	1,097

3.4 Projected Water Deliveries

The projected water deliveries provided in this section are based on population estimates (Table 2-1) and the objective to meet per-capita water use targets for 2015 and 2020 (Table 3-4). The deliveries plus the system losses (discussed in Section 3.7) make the total projected gross water use.

From 2010 to 2015, the population is projected to increase by approximately 10-percent. Water deliveries are projected to decrease in 2015. This is based on drought regulations issued by the State for TODB in 2014/15. These water reductions are occurring through ongoing water conservation efforts. In addition, TODB will be completing a recycled water project in early 2015 at the WWTP that will offset approximately 28 MGY of potable water use, which are currently categorized as system losses (discussed further below in Section 3.7 System Losses and Additional Water Uses). The combination of water conservations (discussed in Chapter 6) and the WWTP recycled water project (discussed in Chapter 4) will enable TODB to meet the interim per-capita water use target by 2015 of 236 gpcd.

Table 3-8 provides the projected water deliveries in 2015.

Table 3-8 (DWR Table 5)
Water deliveries — projected, 2015

	2015				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume (MGY)	# of accounts	Volume (MGY)	Volume (MGY)
Single family	2,389	363	3,295	501	864
Multi-family	0	0	224	25	25
Commercial Institutional	55	44	21	17	61
Landscape	90	136	10	15	151
Other	0	0	0	0	0
Total	2,534	544	3,550	558	1,102

Table 3-9 provides the projected water deliveries in the year 2020. From 2015 to 2020 the population is estimated to increase by approximately 20-percent. This was correlated by an increase in residential services connections from 2010 to 2020. Water deliveries from 2015 to 2020 are projected to increase by approximately 21-percent. The overall per-capita water use declines from 2010, and TODB is projected to meet the water use target of 210 gpcd. This is based on implementation of water conservation measures (discussed in Chapter 6). The largest reductions are anticipated to come from retrofitting meters on all un-metered services, establishing conservation pricing, and reducing pipeline leakage by replacing water mains.

Table 3-9 (DWR Table 6) Water deliveries — projected, 2020					
	2020				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume (MGY)	# of accounts	Volume (MGY)	Volume (MGY)
Single family	6,814	1,075	0	0	1,075
Multi-family	224	27	0	0	27
Commercial Institutional	91	74	0	0	74
Landscape	101	162	0	0	162
Other	0	0	0	0	0
Total	7,230	1,338	0	0	1,338

Table 3-10 provides the projected water deliveries for the years 2025, 2030 and 2035. Water services are projected based on the project population beyond 2020. As discussed in Chapter 2, no growth is anticipated to occur between 2020 and 2030 based on local environmental and permitting considerations. The combination of water deliveries and water losses (i.e. gross water use) beyond 2020 are anticipated to meet the per-capita water use target of 209 gpcd.

Table 3-10 (DWR Table 7) Water deliveries — projected 2025, 2030, and 2035						
	2025		2030		2035	
	metered		metered		metered	
Water use sectors	# of accounts	Volume (MGY)	# of accounts	Volume (MGY)	# of accounts	Volume (MGY)
Single family	6,814	1,075	6,814	1,075	8,070	1,273
Multi-family	224	27	224	27	350	43
Commercial Institutional	91	74	91	74	100	81
Landscape	101	162	101	162	120	192
Other	0	0	0	0	0	0
Total	7,230	1,338	7,230	1,338	8,640	1,589

3.5 Low-Income Residential Water Use

Water suppliers must include in the UWMP an estimate of projected water use for lower income households as defined in Section 50079.5 of the Health and Safety Code. The estimate must be based on the housing element needs identified in the general plan for the water supplier's service area. TODB does not have direct information pertaining to lower income households served, or planned to be served in future developments in the service area. The Contra Costa County

General Plan identified low-income housing needs in designated locations in the County; however, those needs were not designated specifically in Discovery Bay. The 2010 US Census reports that 6.3-percent of the population in Discovery Bay is below the poverty. For the purposes of the UWMP, projected water deliveries to low-income households is assumed to be 6.3-percent of total water deliveries.

Table 3-11 (DWR Table 8)
Low-income projected water demands

Low Income Water Demands	2015	2020	2025	2030	2035
Single-family residential	54	68	68	68	80
Multi-family residential	2	2	2	2	3
Total	56	69	69	69	83

3.6 Wholesale Water Demand Projections

TODB does not provide wholesale water to other agencies, and does not anticipate wholesale water sales in the future.

Table 3-12 (DWR Table 9)
Sales to other water agencies

Water distributed	2005	2010	2014	2015	2020	2025	2030	2035
N/A	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0

3.7 System Losses and Additional Water Uses

Additional water uses are presented in Table 3-13. The two additional water uses that are not shown in the tables above are: 1) potable water uses at the wastewater treatment plant (WWTP); and, 2) unaccounted system losses (e.g. pipeline leakage, hydrant flushing and WWTP). The water system production is equal to the sum of the water deliveries (Tables 3-5 through 3-10) and the additional water losses.

The WWTP is estimated to use approximately 28 MGY of potable water in wastewater treatment processes. This is included in the baseline water use. TODB is constructing a recycled water project at the WWTP that will eliminate the need for potable water. The project will be

completed in mid-2015 and will result in a savings in water production and reduction of the per-capita water use by the system.

Other unaccounted system losses are attributed to flushing programs, pipe breaks and pipe leakage. System losses are estimated to range from 0-12% of total production. TODB is preparing to make water main upgrades and enhance the capabilities of leak detection and repair, which will reduce water losses based upon the quantity and age of pipe planned to be replaced. TODB is also preparing to install customer meters, which will improve the estimate and tracking of water system losses.

Table 3-13 (DWR Table 10)
Additional water uses and losses

Water use[1]	2005	2010	2014	2015	2020	2025	2030	2035
Saline barriers	0	0	0	0	0	0	0	0
Groundwater recharge	0	0	0	0	0	0	0	0
Conjunctive use	0	0	0	0	0	0	0	0
Raw water	0	0	0	0	0	0	0	0
WWTP water use	28	28	28	0	0	0	0	0
Recycled water (WWTP use)	0	0	0	28	28	28	28	28
System losses	106	154	4	77	67	67	67	79
Total	134	182	32	105	95	95	95	107

[1] *Any water accounted for in Tables 3-5 through 3-10 are not included in this table.*

3.8 Total Water Use

Total water use is the sum of water deliveries to each customer category, WWTP water use, and future recycled water use at the WWTP and water system losses. Table 3-14 provides total water use.

Table 3-14 (DWR Table 11)
Total water use

Water Use	2005	2010	2014	2015	2020	2025	2030	2035
Total water deliveries (from Tables 3-5 to 3-10)	1,070	1,124	1,097	1,102	1,338	1,338	1,338	1,589
Sales to other water agencies (from Table 3-12)	0	0	0	0	0	0	0	0
Additional water uses and losses (from Table 3-13)	134	182	32	105	95	95	95	107
Total	1,204	1,306	1,129	1,206	1,433	1,433	1,433	1,697

3.9 Water Use Reduction Plan

TODB is not an urban wholesale water supplier. Therefore, it is not required to provide an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions in wholesale water.

TODB implements water conservation management tools to maximize water resources. See Chapter 6 for information on water reduction plan for TODB as a retail water supplier.

Chapter 4 System Supplies

Chapter 4 describes TODB water supplies with descriptions of water sources, limitations, water quality and potential opportunities for recycled water.

4.1 Water Sources

TODB's water supply is provided from a series of five production wells. Groundwater pumped from the wells occurs in the Tracy Subbasin of the greater San Joaquin Valley Groundwater Basin. The groundwater basin is not adjudicated and DWR has not identified or projected the basin to be in overdraft. TODB has no other current sources of water or any surface water rights.

TODB maintains well facilities based on meeting the maximum day demand of its system with the largest well source offline, in accordance with State of California Code of Regulations, Title 22 California Waterworks Standards. TODB is in the process of constructing a new water supply well (Well #7) to provide redundant backup supplies to meet current and future maximum day demands with the largest well out-of-service.

Table 4-1, below, presents the existing production well information:

Table 4-1
Groundwater Supply Well Information

	Well 1B	Well 2	Well 4A	Well 5A	Well 6
WELL INFO					
Drilling Date	1995	1971	1996	1991	2009
Well Diameter (inch)	16"	12"	16"	16"	18"
Well Depth (ft)	350'	348'	357'	357'	360'
Top Screen Interval	271'/289'	245'/335'	307'/347'	261'/291'	270'/295'
24-hr Specific Capacity	10 gpm/ft	11 gpm/ft	23 gpm/ft	21 gpm/ft	28 gpm/ft
PUMP INFO					
Pump Type	Submersible	Oil Lube	Submersible	Water Lube	Submersible
Installation Date	2003	2003	2001	2004	2010
Pump Setting Depth (ft)	260'	220'	180'	240'	250'
Column Diameter (inch)	12"	8"	12"	10"	12"
Bowl Manufacturer	Byron Jackson	Goulds	Flowserve	Floway	Flowserve
Impeller Model	13MQH	11CHC	13MQH	14DKH	14EMM
Number of Stages	3	4	3	3	3
Motor Horsepower	150 HP	100 HP	150 HP	200 HP	150 HP
Well Control	Willow Tanks	Willow Tank	Newport Tanks	Newport Tanks	Willow Tanks
Capacity	1,500 gpm	800 gpm	1,800 gpm	1,800 gpm	2,200 gpm

TODB's projected water supplies are summarized in Table 4-2 and are discussed in more detail within this chapter. There is no wholesale water, surface water, exchanges, or desalinated water projected as future TODB supply sources. Projections of recycled water use are based on potential projects discussed in Section 4.5.

Table 4-2 (DWR Table 16)
Water supplies — current and projected (MGY)

Water Supply Sources	2010	2014	2015	2020	2025	2030	2035
Supplier-produced groundwater	1,306	1,129	1,178	1,405	1,405	1,405	1,669
Supplier-produced surface water	0	0	0	0	0	0	0
Transfers in	0	0	0	0	0	0	0
Exchanges In	0	0	0	0	0	0	0
Recycled Water 0	0	28	28	28	28	28	28
Desalinated Water	0	0	0	0	0	0	0
Total	**1,306**	**1,129**	**1,206**	**1,433**	**1,433**	**1,433**	**1,697**

4.2 Groundwater

4.2.1 Geologic Setting and Occurrence of Groundwater

Discovery Bay is located in eastern Contra Costa County in the northwestern San Joaquin River Valley portion of the Great Valley geomorphic province of California. The province is characterized by the low relief valley of the north-flowing San Joaquin River and the south-flowing Sacramento River, which merge in the Delta region just north of the community draining westward to the Pacific Ocean.

To the west of Discovery Bay, the Coast Range province consists of low mountains of highly deformed Mesozoic and Cenozoic marine sedimentary rocks. These thick marine rocks extend eastward below the Great Valley where they are the targets for gas exploration.
Overlying the marine rocks is a sequence of late Cenozoic (Miocene, Pliocene, and Pleistocene) non-marine sedimentary deposits. Small areas of surface exposures of these deposits occur along the edge of the Coastal Range. These beds dip moderately to the east and extend below the San Joaquin Valley. In the subsurface, the nature of these deposits is poorly known, but they are believed to be dominated by fine-grained clays, silts, and mudstones with few sand beds. The lower portion of these deposits may be in part equivalent to the Miocene-Pliocene Mehrten Formation along the east side of the Great Valley. The Upper portion of Pliocene and Pleistocene age may be equivalent to the Tulare Formation along the west side of the San Joaquin Valley to the south, and the Tehama Formation of the Sacramento Valley to the north. It is believed these deposits extend from about 400 feet to 1,500-2,000 feet below the San Joaquin River. Water quality from electric logs is difficult to interpret, but the quality appears to become brackish to saline with depth.

Late Cenozoic (Pleistocene and Holocene; 600,000 years to present) sedimentary deposits overlie the older geologic units. These deposits are largely unconsolidated beds of gravel, sand, silts, and clays. The deposits thicken eastward from a few tens of feet near the edge of the valley to about 400 feet at the Contra Costa County line. West of Discovery Bay, the deposits are characterized by thin sand and gravel bands occurring within brown sandy silty clays and are believed to have formed on an alluvial fan plain fed from small streams off the Coastal Range to the west. The alluvial plain deposits interbed and interfinger with deposits of the fluvial plain to the east. The fluvial deposits consist of thicker, more laterally extensive sand and gravel beds of stream channel origin interbedded with flood plain deposits of gray to bluish sandy to silty clays. Discovery Bay overlies the fluvial plain area of eastern Contra Costa County. Groundwater supply in Discovery Bay is extracted for supply from these deposits to a depth of about 350 feet.

The regional geologic setting is shown on the San Francisco-San Jose 1º by 2º quadrangle (Wagner and others, 1990). Detailed surface geologic maps of the Coast range in this area include Davis and Goldman (1958), Brabb and others (1971), and Dibblee (1980 a, b, c). Subsurface characterization of the marine rocks beneath the San Joaquin Valley can be found in oil and gas field summaries produced by the California Division of Oil and Gas (1982), and Thesken and Adams (1995). General geologic descriptions and histories of these marine rocks are contained in Bartow (1991), and Bertoldi and others (1991). Because of their marine origin, highly consolidated nature, and presence of saline water, the Mesozoic and tertiary marine rocks are not a source of potable water supply in the region.

A regional study of the thickness of the Tertiary-Quaternary non-marine sedimentary deposits was made by Page (1974) and evaluations of the depth to base of fresh water by the California State Water Project Authority (1956) and Berkstresser (1973). Regional studies of the Sacramento-San Joaquin Valley groundwater basin were performed by Bertoldi and others (1991), and Page (1986). The United States Geological Survey (USGS) compiled water quality information that covers the area in a series of reports (Keeter 1980; Sorenson 1981; and Fogelman 1982). California Department of Water Resources (DWR, 1967) covers the groundwater resources of the San Joaquin County to the east. Local water agencies including TODB participated in a groundwater resources study of eastern Contra Costa County (Luhdorff & Scalmanini Consulting Engineers, 1999). The east Contra Costa County area is also under a groundwater management plan (Diablo Water District, 2007), which was also prepared by Luhdorff & Scalmanini. Luhdorff & Scalmanini also conducted a study of groundwater resources pertaining directly to Discovery Bay (1993) and a water master plan (2010).

4.2.2 Hydrogeologic Setting in Discovery Bay

The hydrogeology of Discovery Bay is illustrated through a geologic cross section on Figure 4-1. The cross section depicts water wells that are the source of supply for the TODB water system.

The deepest sand unit encountered in water wells in Discovery Bay is below about 350 feet and is interpreted as the uppermost, older non-marine deposits of largely fine-grained silt and clay with thin, fine sand interbeds. Water quality appears to be poor to brackish in this unit.

Overlying units are comprised of Pleistocene alluvium of generally thick beds of sand and gravel with a thin clay interbed. These are probably stream channel deposits of a northward flowing ancestral San Joaquin River. This is the main production aquifer completed in all TODB supply wells (see Aquifer A on Figure 4-1).

Overlying Aquifer A is a thick sequence of grayish to bluish silt and clay with thin inter beds of sand. This unit, which confines the production zone, appears to represent deposition on a floodplain with the main stream channels probably further east. The thin sand appears to represent flood-sprays of sand spread out on to the flood plain.

Another aquifer unit, labeled Aquifer B on Figure 4-1, occurs above about 140 feet below ground surface and consists of a thinner sand and gravel bed. Again, these appear to be stream channel deposits. However, Aquifer B has been found to contain brackish to saline water, which must be sealed off to protect water quality of the supply source in Aquifer A and avoid corrosion of the well casing.

Overlying Aquifer B is a sequence of gray to brown silt and clay beds with some thin sand beds. These beds appear to be either floodplain deposits or possibly distal alluvial plain deposits from the west.

4.2.3 Groundwater Conditions

Groundwater conditions that are relevant to the Discovery Bay water system are discussed below in terms of water levels and water quality.

Groundwater Levels

Groundwater level data are available since the late 1980s when Discovery Bay was developed. Since that time, TODB has conducted a monitoring program to aid in sustainable groundwater management. Figure 4-2 is a hydrograph showing water level trends using data obtained from TODB supply wells. The hydrograph highlights drought periods and pumpage. The trends in pumpage correspond to population growth rates.

Early water well driller reports indicate that before significant groundwater pumping occurred, static levels in Discovery Bay were near sea level. At this elevation, depth-to-water was about 10 feet below ground surface. With the onset of pumping and initial growth, the static level in production wells exhibited seasonal variations between 10 and 40 feet below ground surface (see Figure 4-2). During this period, pumpage increased from about 300

million gallons per year (MGY) in 1987 to about 800 MGY by 2001. Between 2001 and 2008, pumpage increased to 1,300 MGY. After 2008, pumpage leveled off as a result of the national economic downturn and water levels since 2008 have exhibited stable to rising trends. Water level measurements in fall 2014 were higher than the last year of the 2007-09 statewide drought.

The stability in groundwater levels in recent dry years indicates that groundwater pumpage is sustainable at current usage by TODB. To ensure future sustainability, TODB is a participant with other regional water users in seeking to form a Groundwater Sustainability Agency under the Sustainable Groundwater Management Act of 2014. In accordance with the legislative act, groundwater users shall develop a groundwater sustainability plan or alternative that achieves sustainable management of the resource.

Groundwater Quality

Groundwater quality from TODB supply wells meets all California primary drinking water standards. The groundwater does not meet secondary standards for manganese and exceeds the drinking water maximum contaminant limit (MCL) of 0.050 mg/L for that constituent. With manganese removal treatment instituted, manganese has been eliminated as a water quality issue.

Groundwater also is hard and high in total dissolved solids (TDS) concentration, but does not exceed the upper MCL (1,000 ppm) for TDS. Because of the depth of the primary aquifer (see Aquifer A in Figure 4-1) and intervening clay layers, source protection is achievable with appropriate annular seals in the well structure. As a result, none of the wells have exhibited anthropogenic sources of contamination such as volatile or semi-volatile organic contaminants that are often found in urbanized settings.

The most important water quality concern for the well sources in Discovery Bay is the brackish to saline water that occurs in Aquifer B overlying the main completion targets of the supply wells (see Figure 4-1). Historic wells in Discovery Bay experienced failure due to improper sealing of wells through the saline Aquifer B. This led to rapid corrosion of well casings and cross-contamination of the drinking water source by saline water. At present, Well 5A exhibits evidence of cross-flow and the well is operated under strict protocol to mitigate potential cross flow between Aquifers A and B. TDS in Well 5A recently raised to anomalously high levels on the order of 1,500 ppm (a future Well 8 will be added if Well 5A is deemed inadequate). The other wells exhibit stable levels of TDS with time as shown in Figure 4-3.

In the absence of chronic downward trends in water levels or degraded water quality, the state of TODB's groundwater supply is considered sustainable and does not exhibit any characteristics of unsustainability as defined under the 2014 Groundwater Sustainable Management Act.

4.2.4 Well Yields and Aquifer Characteristics

Specific capacities of TODB supply wells vary from less than 10 to over 30 gallons per minute per foot of drawdown (gpm/ft). At these magnitudes, the Discovery Bay supply wells can be equipped to pump at capacities up to 2,200 gpm. Historic testing indicate that the primary production aquifer has a transmissivity ranging from about 50,000 to 100,000 gallons per day per foot and a storativity that is consistent with a confined system. Aquifer parameter estimates provide a basis for evaluating well performance and appropriate spacing of future wells to minimize mutual pumping interference.

Proper maintenance and early identification of degradation in well yields are important activities for a system that relies entirely on well water as a source. In 2007, Discovery Bay instituted a biannual program to test the well facilities, which included quantification of specific capacity. Through this program, specific capacity testing is used to schedule rehabilitation programs and identify signs of structural problems. Each testing event is documented with a report discussing changes since the last reporting period and recommendations for preventative or remedial work to sustain source capacity. Since structural problems may be forewarned by increasing salinity (i.e., because of the presence of shallow brackish water), water quality testing is an integral part of the biannual testing.

The volume of water pumped from the groundwater supply 2006 through 2014 is provided in Table 4-3. Historically, all water used has come from the groundwater basin.

Table 4-3 (DWR Table 18)
Groundwater — volume pumped (MGY) *

Basin name(s)	Metered or Unmetered	2006	2007	2008	2009	2010	2014
San Joaquin Basin	Metered	1,185	1,322	1,328	1,282	1,306	1,129
Total groundwater pumped		1,185	1,322	1,328	1,282	1,306	1,129
Groundwater as a percent of total water supply		100%	100%	100%	100%	100%	100%

*Based on metered water production records. All water produced derived from groundwater wells.

The volume of water projected to be pumped from the groundwater supply is provided in Table 4-4. Starting in 2015, TODB will obtain 28 MGY of water as reclaimed water used onsite at the wastewater treatment plant (discussed in more detail below).

Table 4-4 (DWR Table 19) Groundwater — volume projected to be pumped (MGY) *					
Basin name(s)	**2015**	**2020**	**2025**	**2030**	**2035**
San Joaquin Basin	1,178	1,405	1,405	1,405	1,669
Total groundwater pumped	1,178	1,405	1,405	1,405	1,669
Percent of total water supply	97.7%	98.0%	98.0%	98.0%	98.3%

*Projected groundwater pumping based on projected water demand, less the future WWTP recycled water source.

4.2.5 Groundwater Basin Yield and Monitoring

Discovery Bay overlies the northwestern portion of the Tracy Subbasin, which is one of sixteen subbasins in the San Joaquin Valley Groundwater Basin as designated by the California Department of Water Resources (Bulletin 118, 2003 Update). The Tracy Subbasin boundaries are defined by the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River on the east; and the San Joaquin-Stanislaus County line on the south. The western subbasin boundary is defined by the contact between the unconsolidated sedimentary deposits and the rocks of the Diablo Range (DWR, 2004).

The reliability of future groundwater supply for Discovery Bay is based on an assumption that the yield of groundwater system is sufficient to sustain current and future pumping. As indicated above, water level and water quality data indicate stable groundwater conditions at current levels of pumping and TODB is taking measures to sustainably manage future growth in accordance with the Sustainable Groundwater Management Act of 2014.

4.3 Transfer Opportunities

TODB does not participate in transfer or exchange programs and does not have any planned in the future.

4.4 Desalinated Water Opportunities

TODB does not plan to build desalinated water plants and there are no opportunities for the development of a desalinated water plant for future water supplies.

4.5 Recycled Water Opportunities

This section provides information on recycled wastewater and its potential for use as a water resource in the service area.

TODB owns and operates a community wastewater collection, treatment and solids disposal facilities. The information in this section was provided by TODB in coordination with the wastewater engineering consultant, Herwit Engineering, and from information provided in the TODB 2010 Wastewater Master Plan[6].

4.5.1 Wastewater Collection and Treatment System Description

Wastewater is collected and conveyed to the wastewater treatment plant (WWTP) by a network of gravity sewer mains and force mains. There are fifteen sewage pumping stations within the Discovery Bay sewage collection system that deliver sewage from the developments to the overall wastewater treatment plant, which is located on the north and south sides of Highway 4 and directly southeast from the Discovery Bay community.

The WWTP currently produces a disinfected secondary effluent that is discharged to Old River. The WWTP consists of an influent pump station, influent screening, secondary treatment facilities using oxidation ditches, and ultraviolet (UV) disinfection prior to discharge into Old River. The WWTP average daily flow in 2010 was approximately 1.75 million gallons per day (MGD). The facilities are permitted by the Regional Water Quality Control Board (RWQCB) to treat and discharge to Old River under specific waste discharge requirements (WDRs).

The facilities include a solids handling system for the residual sludge or biosolids developed in the wastewater treatment plant. Solids handling facilities consist of waste activated sludge (WAS) pumping systems, a small aerobic digester, two sludge lagoons, a belt press dewatering facility, and four active solar sludge dryers. The solids handling system currently uses approximately 28 million gallons per year (MGY) of potable water through a 4-inch water service connection to the WWTP.

Table 4-5 provides the current and projected wastewater flows for TODB.

[6] 2013, Stantec Consulting Services Inc., The Town of Discovery Bay Community Services District Wastewater Treatment Plant Master Plan

Table 4-5 (DWR Table 21) Current and Projected Wastewater Flows (MGY)						
Type of Wastewater	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Wastewater collected & treated in service area – Average Daily Flow	660	770	880	880	880	1,030
Volume that meets recycled water standards	0	0	880	880	880	1,030

4.5.2 Quantity of Available Treated Wastewater that Meets Recycled Water Standards

Title 22 sets forth the regulations that govern recycled water treatment and uses. There are specific filtration and disinfection requirements to use recycled water in applications such as irrigation of landscaping areas. Currently, the effluent from the WWTP is not treated to meet the requirements of Title 22 for such applications. TODB is planning to construct improvements in 2017 to treat all the effluent to meet the Title 22 requirements for "disinfected tertiary recycled water" in order to comply with the discharge permitting requirements of the National Pollutant Discharge Elimination System (NPDES). When these improvements are made, there will be a treated effluent from the WWTP that meets Title 22 recycled water standards that will be available for use in the water system for recycled water applications (e.g. landscape irrigation) but not for domestic drinking water purposes.

Table 4-6 provides the estimated current and future non-recycled wastewater disposal.

Table 4-6 (DWR Table 22) Recycled water — non-recycled wastewater disposal (units in MGY)							
Method of disposal	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Discharged to Old River through secondary effluent lift station	Secondary	660	770	0	0	0	0
Discharged to Old River through future tertiary effluent lift station	Disinfected Tertiary	0	0	880	880	880	1,030
	Total	660	770	880	880	880	1,030

4.5.3 Recycled Water Current and Potential Future Uses

Current Recycled Water Project – Onsite Reclaimed Water System

As noted above the effluent does not currently meet Title 22 requirements for recycled water uses in the water system. However, Title 22 allows a restricted use of untreated recycled water onsite at the wastewater treatment plant, provided public access to the recycled water is

restricted. TODB is completing a project in early 2015 that will utilize the secondary effluent from the WWTP in the solids handling process.

Currently, the belt presses and spray nozzles in the solids handling process require a water source that uses approximately 28 MGY of potable water from the system. The actual water requirements vary based on time of year. A baseline flow of approximately 50 gallons per minute (gpm) is required with peak use over 300 gpm during the summer months when the belt presses and the drying process is operating. The maximum capacity of the onsite reclaim water system will be 400 gpm to supply water during peak demand requirements. After completion of this project, potable water will no longer be required in the WWTP processes.

Future Potential Recycled Water Uses

After completion of the tertiary treatment systems in 2017, TODB will have recycled water available for use in the water system. There are potential opportunities for use of recycled water; however, none are being pursued at this time. Potential uses and limitations of recycled water are discussed below, and summarized in table 4-7.

Water quality concerns: Of particular concern with recycled water application to irrigation is the source water quality. Boron and salinity are two important parameters when irrigating for agricultural and landscape purposes. Crops and vegetation have varying levels of tolerance to these parameters (among others); however, it generally starts to be an issue when boron is above 2 parts per million (ppm) or electrical conductivity (EC) is above 2000 micro-Siemens per centimeter (µS/cm). The groundwater wells have boron at approximately 1-2 ppm concentrations, whereas the secondary effluent from the WWTP contains boron ranging from 3-4 ppm. The groundwater wells generally have an EC of around 500 µS/cm, whereas the secondary effluent is 2100 µS/cm. Salinity is known to increase in wastewater due to point-of-use water softeners treating water hardness. Boron and salinity will not be removed in the recycled water, and could pose operational issues if applied to landscape irrigation.

Similar recycled water quality issues are present in other systems. In response to recycled water quality issues it has become common practice to blend recycled water to decrease concentrations, or to cycle between recycled water and potable water to reduce soil column salt loading. For the purposes of assessing recycled water potential in the UWMP, it is assumed irrigation water could only meet half (50%) of its demand from recycled water due to poor water quality issues noted above.

Purple pipe systems: All of the newer developments in TODB (from 1999 and on) are constructed with “purple pipe”, which is dedicated for distribution of recycled water to the system. The older developments do not have a purple pipe system. The purple pipes

can connect to public irrigation services as well as individual residences for landscape needs. It is estimated that at build-out in 2020, approximately 36% of the service area will have purple pipe. The estimated irrigation demand for these areas (residential and public irrigation) is approximately 300 MGY, and approximately half can be served recycled water (150 MGY) due to operational considerations with water quality.

Those developments with purple pipe are located on the opposite side of the service area from the wastewater treatment plant. Connecting the purple pipe systems to the WWTP would require a 5-mile transmission, likely to be a 12-inch diameter pipe through congested utilities and a highway crossing. It is estimated that construction costs for such a project is on the order of $4-6 million. Based on this conceptual assessment, the project would likely serve up to 150 MGY, which equates to the amount of water used by 770 equivalent dwelling units (EDU). In comparison, a typical groundwater supply well in TODB can serve twice as many EDU (approximately 1,500 EDU) and cost half as much to construct (approximately $2 million). A recycled water pipeline is not being pursued due to cost-to-benefit, and given the current outlook of groundwater appears to be sustainable; however, the project could become more economically feasible if grant funding were available to supplement the cost and will be considered further by TODB.

Other potential applications: Other potential uses for recycled water is irrigation in the Discovery Bay golf course or in the adjacent agricultural fields, neither of which is currently supplied water by the TODB system. Therefore supplying recycled water to these would not reduce the per-capita water use of TODB. The golf course is part of an HOA that has surface water rights for irrigation. Agricultural lands surrounding TODB are irrigated with surface and groundwater. TODB may still considered delivering recycled water to the golf course or agricultural fields as a benefit to regional water supplies even though it would not reduce the per-capita water use in the TODB system.

Groundwater recharge is another alternative for the recycled water use. As discussed above, TODB's groundwater supply is from a confined aquifer system and could not be replenished from a surface recharge. Injection would be the only alternative for recharge, which has limited cost-to-benefit considering the high costs for delivery, construction, permitting and operational complexities associated with injection.

Table 4-7 (DWR Table 23) Recycled water — potential future use (units in MGY)							
User type	**Description**	**Feasibility**	**2015**	**2020**	**2025**	**2030**	**2035**
Agricultural irrigation	Non-customer uses	Pending further investigation	0	0	0	0	0
Landscape irrigation[1]	Purple Pipe in newer developments	Technically feasible, high cost for transmission	0	0	0	0	150
Golf course irrigation	Non-customer uses	Pending further investigation	0	0	0	0	0
Wildlife habitat	N/A	N/A	0	0	0	0	0
Wetlands	N/A	N/A	0	0	0	0	0
Industrial reuse	N/A	N/A	0	0	0	0	0
Groundwater recharge	N/A	No identified needs	0	0	0	0	0
Seawater barrier	N/A	N/A	0	0	0	0	0
Geothermal/Energy	N/A	N/A	0	0	0	0	0
WWTP use	Onsite reclaim water system	Will be completed in March 2015	28	28	28	28	28
	Total	0	0	0	0	0	178

[1] *Includes parks, schools, cemeteries, churches, residential, and commercial and public facilities*

4.5.4 Methods to Encourage Recycled Water Use

The most feasible uses of recycled water include the onsite uses at the WWTP, irrigating in the system using the existing purple pipe network, golf course irrigation and nearby agricultural irrigation. The latter two are not part of TODB potable water demand and would not reduce per-capita consumption for TODB; however, those may still be pursued as a benefit to other surface and groundwater uses outside of TODB under a groundwater sustainability plan. Furthermore, as discussed above, irrigation uses within the system using the existing purple pipe are likely to only be pursued further if grant funding is identified for such a project.

4.5.5 Plan for Optimizing Use of Recycled Water

Given the conclusions of limited current recycled water use and uncertainty with the viability of future recycled water use, there is no current plan to optimize recycled water nor is there a separate master plan for recycled water beyond the information presented above.

4.6 Future Water Projects

TODB's future water supply projects were identified in the Capital Improvement Program developed in the 2010 Water Master Plan. The projects involve new facilities and upgrades to facilities to meet current and projected water demand and replacement of aging infrastructure. None of the water projects are required to address supplies for average, single-dry, or multiple-dry years. Table 4-8 provides a summary of the water-related projects in the TODB Capital Improvement Program.

Table 4-8 (DWR Table 26)
Future water supply projects

Project name	Projected start date	Projected completion date	Impacts to Water Supply Reliability in Average, Single-Dry, and Multiple-Dry Years *
Water Supply Well 7	2014	2015	N/A
Well 8 (contingency replacement)	Unknown	Unknown	N/A
New Filter Unit WLWTP	2016	2016	N/A
New Backwash Tank WLWTP	2016	2016	N/A
New Recycle Pumps WLWTP	2016	2016	N/A
Chemical Room Upgrade WLWTP	2015	2015	N/A
Recycle Pump Replacement NDWTP	2016	2016	N/A
Booster Pump Replacement NDWTP	2016	2016	N/A
Kellogg Creek Crossings – 16" Main	2017	2017	N/A
8-inch main Upgrades	2017	2020	N/A
New Water Storage Tank NDWTP	2015	2016	N/A
Customer Water Meter Retrofits	2015	2017	N/A
		Total	

*None of the projects are required to address drought conditions.

A
SOUTH

A'
NORTH

WELL 5A
PROJ. EAST

WELL 4
TH/PW
PROJ. WEST

WELL 3
PROJ. WEST

WELL 4A
PROJ. EAST

WELL 6
PROJ. WEST

WELL 2
PROJ. WEST

WELL 1B
PROJ. WEST

INDIAN
SLOUGH

ECCID #14 E - TH
PROJ. EAST

DEPTH

0
50
100
150
200
250
300
350
400
450
500
550
600

AQUIFER B

AQUIFER A

OLDER
PLEISTOCENE

NONMARINE
DEPOSITS

FLOODPLAIN

STREAM CHANNELS
SANDS & GRAVELS

PLEISTOCENE
ALLUVIUM

FLOODPLAIN
WITH SANDS

STREAM CHANNELS
SANDS & GRAVELS

BASIN
DEPOSITS

TD 405

TH TD 750

TD 360

TD 381

TD 440

TD 365

TD 750

TD 400

Scale in Feet
0' 250' 500' 1000'
Vertical Exag. 10X

LEGEND

WELL 1B
Well Identification

Seal

Clay w/Sand

Sand/Gravel
Screen/Intake

Clay

647
Total Depth

Floodplain

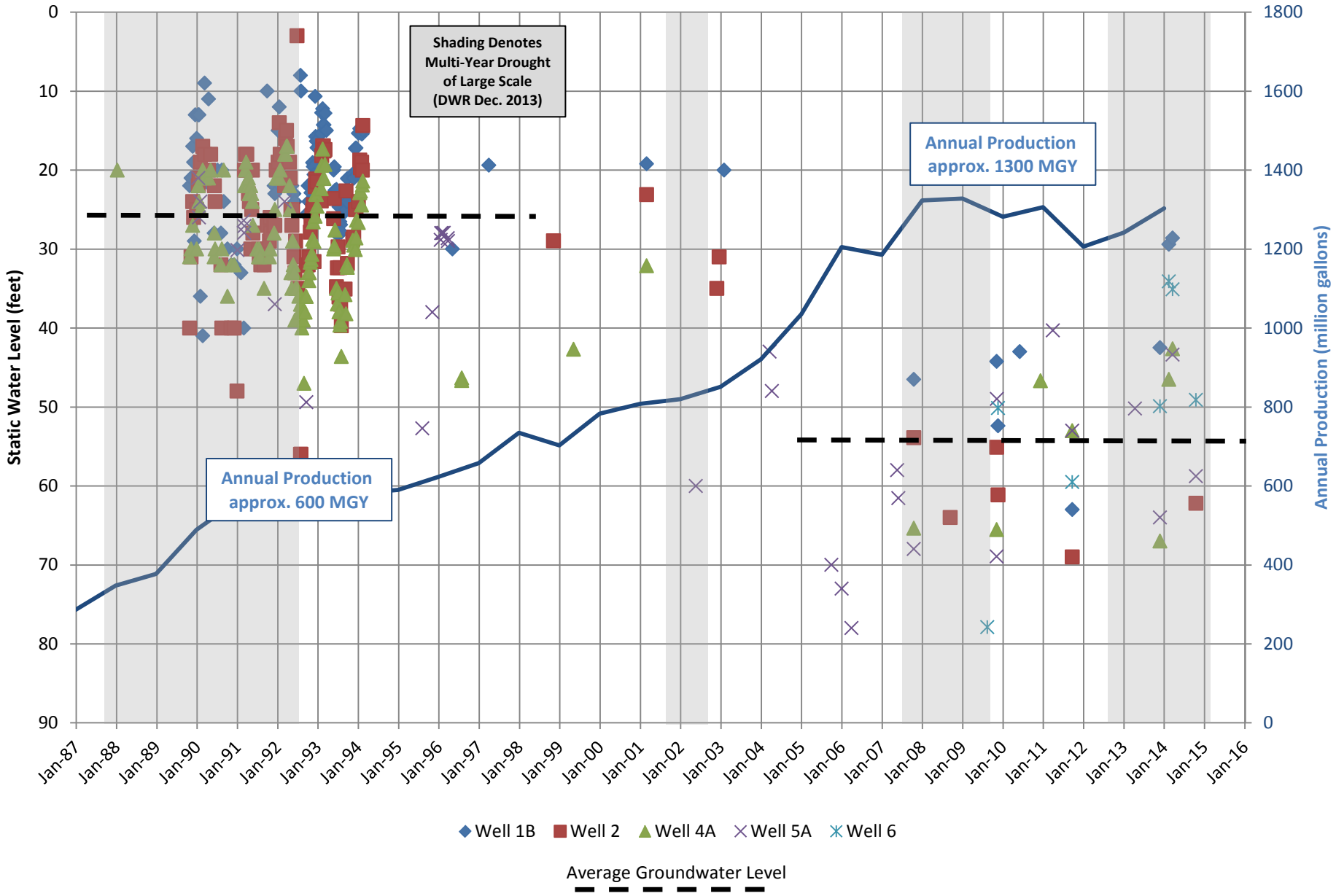
Blue or Gray Clay

Basin Deposits

CAD FILE: G:/Projects/Discovery Bay/14-5-042/Geologic Cross-Section.dwg CFG FILE: LSCE2500.PCP_MRG DATE: 01-30-15 8:14am

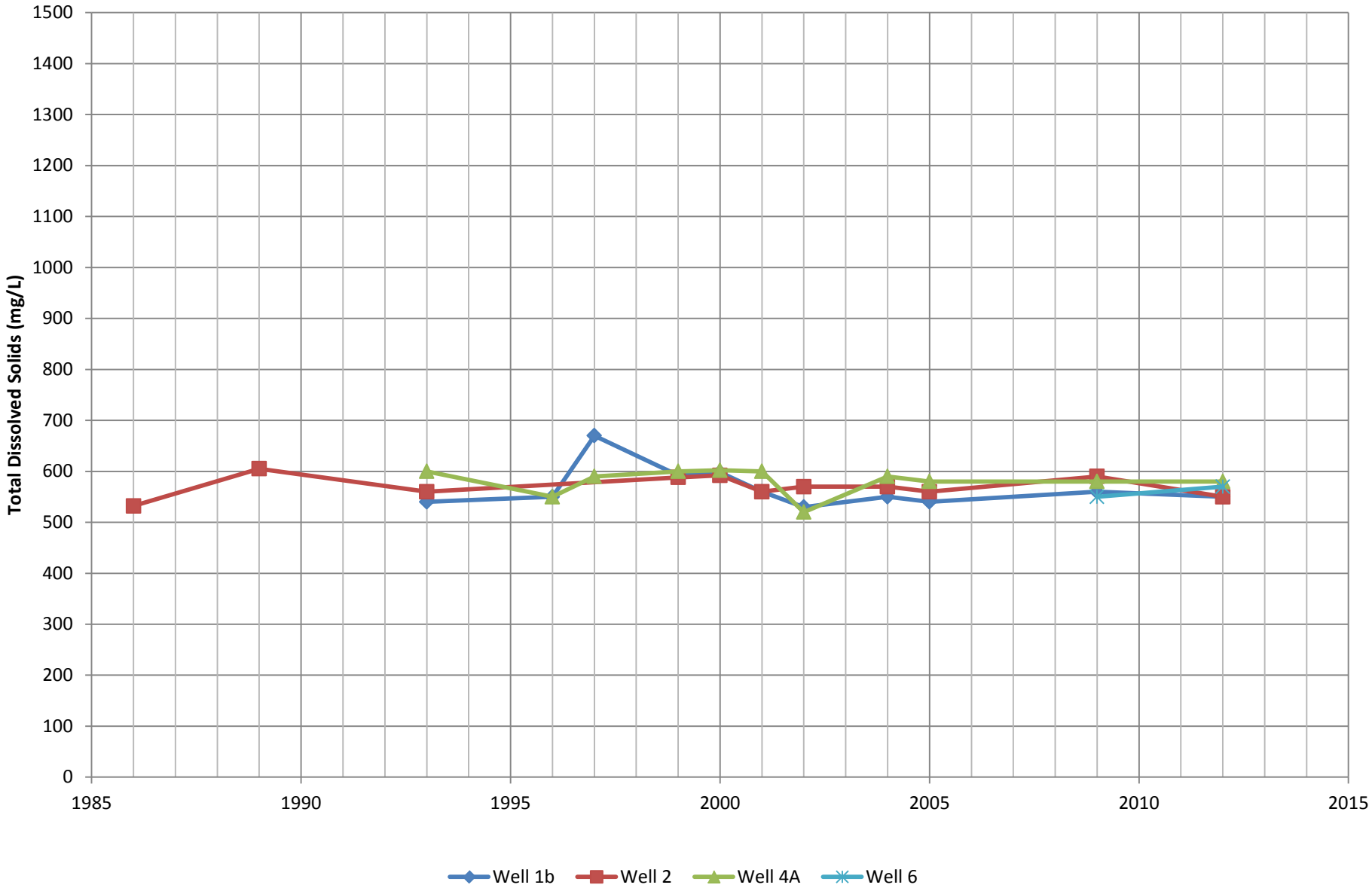
LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Figure 4-1
Geologic Cross Section
Discovery Bay 2010 Urban Water Management Plan



LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Figure 4-2
Static Water Levels, Production, and Drought Periods
DBCSD 2010 Urban Water Management Plan



LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Figure 4-3
Water Quality (TDS) for DBCSD Supply Wells
DBCSD 2010 Urban Water Management Plan

Chapter 5 Water Supply Reliability and Water Shortage Contingency Planning

5.1 Water Supply Reliability

TODB uses only groundwater pumped from a portion of the Tracy Subbasin of the greater San Joaquin Valley Groundwater Basin as its source of supply to the water system. The subbasin from which TODB pumps is not considered in overdraft and is sustainably managed through formal cooperation between local water entities. TODB wells have exhibited no evidence of degradation throughout the development history of the water system and groundwater supplies have been reliable through previous and current drought conditions.

TODB is taking measures to ensure the water supply source will remain reliable through uncertainties in the future including environmental factors that might impact availability of water supply, such as prolonged drought or degradation of water quality through natural or anthropogenic causes. TODB is currently coordinating with other local agencies to develop a Groundwater Sustainability Plan in accordance with the Sustainable Groundwater Management Act of 2014 to protect and adaptively manage the groundwater resource.

TODB is also taking measures to mitigate disruptions in supplies from existing groundwater well infrastructure in catastrophic events, such as earthquakes, can be mitigated. TODB operates five existing wells with a sixth well, Well 7, to be brought online in 2015. This will provide redundancy in the system to offset the loss of a well from catastrophic failure or loss in yield due to aging or other mechanisms.

Though the existing groundwater supplies are not considered vulnerable to water shortages, the information contained in this chapter describes measures taken by TODB to mitigate potential water shortages and drought preparedness from uncertain future events or causes.

5.2 Water Shortage Contingency Planning

This section outlines stages of actions that will be implemented by TODB in the event of water supply shortages and emergency preparedness and plans for catastrophic events. A copy of TODB's Draft Water Shortage Contingency Resolution and Water Shortage Contingency Plan, as well as current water reduction ordinances and resolutions, are in Appendix C.

5.2.1 Stages of Action

CWC Section 10632 (a) requires stages of action to be undertaken by the water supplier in response to water supply shortages, including up to a 50-percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

TODB will implement a four-stage action in response to water supply shortages to comply with State requirements. The stages will be implemented during water supply shortages, or regional drought conditions that may not be directly influencing TODB water supplies. The stage determination and declaration of a water supply shortage will be made by the TODB Board of Directors.

Stage I – This stage is part of an ongoing public information campaign encouraging voluntary water conservation. TODB issued a resolution for voluntary water use in *Resolution 2014-11 – Voluntary Water Reduction* (Appendix C.2). There is little to no water shortage during Stage 1. Although Stage I is ongoing, customers are reminded when a regional single-year drought is occurring , or when TODB has a redundant back-up well offline for repairs, which makes the overall supply system more vulnerable to shortages.

Stage II – This stage would be initiated during moderate water shortage (of up to 15%) and would be the first stage where mandatory conservation and water use prohibitions are enforced. Failure of two groundwater supply wells could cause a moderate reduction in water supply resulting in implementation of Stage II. Stage II would also be implemented during a regional severe drought where water conservation is mandatory but impacts to TODB's groundwater supply wells are negligible or non-existent. During Stage II the Board of Directors will declare prohibitions on water use, in accordance with the TODB *Ordinance No. 25 Establishing Emergency Drought Regulations* (Appendix C.3). This stage is characteristic of the current drought, which is severe throughout the State but has no immediate effects on the TODB groundwater supply.

Stage III – This stage would be initiated during a severe water shortage (15 to 35%), which could be caused by a catastrophic failure of up to three groundwater supply wells. During Stage III, the Board of Directors would adopt a new ordinance providing authority for the General Manager to implement additional prohibitions and consumption reduction methods that would include water rationing if other consumption reduction methods are not effective at reducing demand.

Stage IV – This stage would be initiated during a critical water shortage (35 to 50%), which could be caused by a catastrophic failure of more than three groundwater supply wells. All steps taken in the prior stages would be intensified and production would be monitored daily for compliance with necessary reductions. Residents would be under

water rationing. TODB would be in emergency status to repair and bring online water supply wells.

Table 5-1 lists the four stages of action for the water shortage contingency.

Table 5-1 (DWR Table 35)
Water shortage contingency — rationing stages to address water supply shortages

Stage No.	Water Supply Conditions	% Shortage
I - Voluntary	Normal to Minimum – Ex: loss of a redundant well supply	0-5%
II – Mandatory Conservation	Moderate – Ex: Severe drought *or* catastrophic loss of 2 wells	0-15%
III - Rationing	Severe to Critical – Ex: Catastrophic loss of 3 wells	15-35%
IV – Intense Rationing	Severe to Critical – Ex: Catastrophic loss of 3 or more wells	35-50%

5.2.2 Prohibitions

The CWC Section 10632 (d) requires water suppliers to implement mandatory prohibitions against specific water use practices that may be considered excessive during water shortages. If drought conditions or water shortages warrant mandatory prohibitions (Stage II) TODB will implement the current water shortage emergency response plan, *Ordinance No. 25 Establishing Emergency Drought Regulations* (Appendix C.3). Further mandatory prohibitions will be implemented if warranted based on Stage III or Stage IV conditions. Table 5-2 identifies potential prohibitions that would be enforced during a water shortage emergency.

Table 5-2 (DWR Table 36)
Water shortage contingency — mandatory prohibitions

Prohibitions	Stage When Prohibition Becomes Mandatory
Excessive outdoor watering (causing runoff to non-irrigated areas)	II, III, IV
Use of hose without a shut-off nozzle for vehicle washing	II, III, IV
Application of water to driveways or sidewalks	II, III, IV
Use of water in non-circulating fountain or water feature	II, III, IV
Outdoor irrigation beyond the allowed watering schedule	II, III, IV
Uncorrected plumbing leaks	III, IV
Washing cars	III, IV
Watering lawns/landscapes or filling outdoor water features	III, IV

5.2.3 Consumption Reduction Methods

CWC Section 10632 (e) requires the water supplier to implement consumption-reduction methods during the most severe stages of water shortage that are capable of reducing water use by up to 50%. TODB would implement the water consumption–reduction methods shown on Table 5-3, below. Some of the methods are on-going and are part of the TODB water conservation efforts addressed in the Demand Management Measures.

Table 5-3 (DWR Table 37)
Water shortage contingency — Proposed consumption reduction methods

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (%)
Demand Reduction Program	All stages	10-20%
Water conservation kits	All stages	10-20%
Education programs	All stages	10-20%
Voluntary rationing	All stages	0-20%
Mandatory prohibitions	II, III, IV	10-20%
Apply flow restrictions to customers	III, IV	35-50%
Water shortage pricing	III, IV	10-50%
Apply penalties for excessive water use	II, III, IV	10-50%
Restrict water use for only priority uses	III, IV	10-50%
Mandatory water rationing, per capita allotment	IV	20-50%

5.2.4 Penalties

CWC Section 10632 (f) requires a water supplier to penalize or charge for excessive use, where applicable. In accordance with the TODB Ordinance No. 25, when a water shortage emergency is declared, the General Manager may issue a Notice of Violation to any customer that fails to comply with the conditions of the ordinance. After one notice has been issued further violations shall be punishable by a fine of: $25 for a first violation; $50 for a second violation; $100 for a third violation; and $500 for a fourth violation and any subsequent violation thereafter. Furthermore each day upon which any condition of the ordinance is violated constitutes a separate violation.

During severe and critical water shortages (Stages III and IV), there will be additional charges applied for excessive water use. During these water shortages, the General Manager may take

further actions if violations continue after the one written warning, such as installing a flow-restricting device on the service line, or termination of service for repeated violations of unauthorized water use. Table 5-4 presents the stages during which penalties and charges take effect.

Table 5-4 (DWR Table 38)
Water shortage contingency — penalties and charges

Penalties or Charges	Stage When Penalty Takes Effect
Penalty for excess use	II, III, IV
Charge for excess use	III, IV
Flow Restriction	III, IV
Termination of Service	III, IV

5.2.5 Revenue and Expenditure Impacts During Water Shortages

CWC Section 10632 (f) requires an analysis of the impacts of consumption reduction on the revenues and expenditures of the water supplier. TODB will establish an accounting for tracking expenses and revenue shortfalls associated with water conservation and rationing. TODB maintains reserve funds that can be used to offset expenditure impacts during times of emergency. TODB will implement a surcharge to recover unmitigated revenue shortfalls.

5.2.6 Other Actions During Catastrophic Reductions

In the event of catastrophic reduction in water supplies, TODB would implement emergency preparedness plans, depending on the cause and severity of the water shortage. California Water Code (CWC) Section 10632 (c) requires certain actions to be undertaken by the water supplier during a catastrophic interruption in water supplies. A catastrophic event resulting in water shortage would be any event, either natural or man-made, with varying levels of severity to the water supply conditions. Examples include, but are not limited to, a regional power outage, an earthquake, or other disasters.

TODB has in place an Emergency Operations Plan that would be implemented by the TODB staff in the event of a catastrophic water shortage. TODB has equipped its facilities with standby emergency generators that would be operated if the catastrophic event involved loss of power. Both of the water treatment plants and booster stations are equipped with permanent emergency generators and automatic transfer switches. TODB owns portable generators that can be used to operate the groundwater pumping stations. If there is catastrophic rupturing of pipelines, during

an earthquake for example, the emergency operations procedures would be followed to isolate the damaged sections, notify customers and immediately repair the damage.

5.3 Water Quality Impacts on Water Shortage

Water quality standards for the TODB water system are dictated through the primary and secondary maximum contaminant levels (MCLs) as set forth in the Federal and State Drinking Water Standards. While the TODB raw water supply (groundwater from wells) meets primary MCL standards, it exceeds the secondary MCL for manganese and iron. TODB operates two iron and manganese treatment facilities to comply with the secondary standards for these constituents.

The groundwater supply also contains levels of total dissolved solids (TDS) that are near the maximum contaminant levels. Drinking water regulations specify three MCL levels for TDS: recommended MCL of 500 ppm; an upper MCL of 1,000 ppm; and a short term MCL of 1,500 ppm. All wells are below the recommended level of TDS, with exception of one supply well, Well 5A, which exceeds the recommended level. Well 5A is monitored closely due to a structural feature that permits cross flow from a brackish zone under certain pumping conditions. TODB is currently considering options to optimally use this well in a manner that provides adequate water quality and source protection.

The water quality from the TODB groundwater source has remained at consistent concentrations and there are no measurable or anticipated water shortages that would be caused by degrading water quality in the water supply. As shown in Table 5-5, there are no projected water quality impacts on water supply.

Table 5-5 (DWR Table 30)
Water quality — current and projected water supply impacts

Water Source	Description of Condition	2010	2015	2020	2025	2030	2035
Groundwater	Adequate	0	0	0	0	0	0

5.4 Drought Planning

5.4.1 Water Year Types

In the context of drought planning, this section describes reliability of the water supply and vulnerability to seasonal or climatic shortage for the following water–year types, as defined by CWC Section 1062 (i):

- **Average water year**: *A year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.*

- **Single dry water year**: *Generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies.*

- **Multiple dry water years**: *Generally considered to be the lowest average runoff for a consecutive multiple-year period (i.e., 3 years or more) for a watershed since 1903. For example, 1928–1934 and 1987–1992 were the two multi-year periods of lowest average runoff during the 20th century in the Central Valley. Suppliers should determine this for each watershed from which they receive supplies.*

TODB has not calculated the water year-types for its watershed; however, appropriate base years for TODB would be the same as nearby water agencies. Table 5-6 presents the water year-types reported in The City of Antioch 2010 Urban Water Management Plan, and are considered appropriate for TODB.

Table 5-6 (DWR Table 27)
Basis of water year data

Water Year Type	Base Year(s)
Average Water Year	2000 to 2004
Single-Dry Water Year	1994
Multiple-Dry Water Years	1987-1990

Seasonal fluctuations observed in groundwater levels do not result in any considerable loss of production for TODB. Furthermore, TODB has always been able to pump 100% of its groundwater supply during previous multiple-dry years.

Table 5-2 summarizes the effects water year-types would have on water supply and groundwater production. Annual groundwater production varies depending on the water demand. The maximum production of record was 1,328 MGY in 2008. Had 2015 been a single-dry or multiple-dry year, TODB would have had access to 100% of its groundwater supplies.

Table 5-7 (DWR Table 28)
Supply reliability — historic conditions

Average / Normal Water Year	Single Dry Water Year	Multiple Dry Water Years			
		Year 1	Year 2	Year 3	Year 4
1,328 (record maximum in 2008)	1,328	1,328	1,328	1,328	1,328
Percent of Average/Normal Year:	100%	100%	100%	100%	100%

5.4.2 Three-Year Minimum Water Supply

CWC Section 10632 (b) requires the UWMP to include an estimate of the minimum water supply in the next three years based on the driest three-year historic sequence for the agency's water supply. The driest four-year historic sequence is noted above in Table 5-6, though the recent four years (2011, 2012, 2013 and 2014) have also been exceptionally dry with drought emergencies declared statewide. Throughout TODB history, there have never been impacts to supply caused by droughts. Therefore, there is no limitation on water supply in the next three years associated with drought. Table 5-8 summarizes the estimated minimum water supply in the next three years based on the next three years being the driest three-year historical sequence.

Table 5-8 (DWR Table 31)
Supply reliability — current water sources

Water supply sources[1]	Average / Normal Water Year Supply[2]	Multiple Dry Water Year Supply[2]		
		Year 2015	Year 2016	Year 2017
Groundwater	1,328	1,328	1,328	1,328
Percent of normal year:	100%	100%	100%	100%

5.4.3 Measurement for Determining Actual Consumption Reduction

CWC Section 16032 (i) require the water supplier to develop a mechanism for determining actual reductions in water use when implementing the urban water supply shortage contingency

plan. Water production is measured daily at the water treatment plants that supply water to the system. Metered customers are recorded quarterly. Exceptionally high usage from customers are identified and investigated for potential water loss or over-use. In that event the customers would be notified and the problem remedied.

5.4.4 Water Supply and Demand Assessment

The water supply and demand assessment shall compare the total water supply sources with the total projected water use over the next 20 years for normal, single-dry and multiple-dry years. Tables 5-9, 5-10 and 5-11 provide the assessment of supply versus demand for each water year type. It should be noted that the estimated supply for each year is exactly equal to the estimated potable water demand, because there are no anticipated supply shortages. Furthermore, there is no anticipated impact to groundwater yield for any water year type.

Table 5-9 (DWR Table 32)
Supply and demand comparison — normal year (MGY)

	2015	2020	2025	2030	2035
Supply totals (from Table 4-2)	1,206	1,433	1,433	1,433	1,697
Demand totals (From Table 3-14)	1,206	1,433	1,433	1,433	1,697
Difference	0	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%

Table 5-10 (DWR Table 33)
Supply and demand comparison — single dry year (MGY)

	2015	2020	2025	2030	2035
Supply totals[1,2]	1,206	1,433	1,433	1,433	1,697
Demand totals[2,3,4]	1,206	1,433	1,433	1,433	1,697
Difference	0	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%

[1]Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.

[2]Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.

[3]Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.

[4]The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Table 5-11 (DWR Table 34) Supply and demand comparison — multiple dry-year events						
		2015	**2020**	**2025**	**2030**	**2035**
Multiple-dry year first year supply	**Supply totals**[1,2]	1,206	1,433	1,433	1,433	1,697
	Demand totals[2,3,4]	1,206	1,433	1,433	1,433	1,697
	Difference	0	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%	0%
Multiple-dry year second year supply	**Supply totals**[1,2]	1,206	1,433	1,433	1,433	1,697
	Demand totals[2,3,4]	1,206	1,433	1,433	1,433	1,697
	Difference	0	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%	0%
Multiple-dry year third year supply	**Supply totals**[1,2]	1,206	1,433	1,433	1,433	1,697
	Demand totals[2,3,4]	1,206	1,433	1,433	1,433	1,697
	Difference	0	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%	0%

[1]Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.

[2]Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.

[3]Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.

[4]The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Chapter 6 Demand Management Measures

6.1 Overview

Demand management measures (DMMs) are mechanisms a water supplier implements to improve water conservation and reduce water supply needs of the system. This chapter describes the water conservation efforts from TODB in terms of 14 DMMs that are defined in the 2010 UWMP Guidelines. The plan outlined in this chapter represents TODB's management tools to maximize the local water resources.

The 14 DMMs defined in the 2010 UWMP Guidelines were developed as a coordinated effort by DWR, water utilities, environmental organizations and other interested parties throughout California. This consensus-building effort resulted in the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU), first adopted in 1991 and last amended in 2011. The MOU formalizes an agreement by signatory agencies to commit to water conservation by implementing DMMs that are economically feasible. The MOU is administered by the California Urban Water Conservation Council (CUWCC), which has a Board of Directors comprised of representatives from signatory member agencies.

In preparing this section of the 2010 UWMP, CUWCC members have the option of submitting their annual reports in lieu of describing DMMs. TODB is not a signatory member and, therefore, is providing a detailed description of each DMM as it relates to water conservation efforts pursued by TODB.

6.2 Demand Management Measure Implementation

This section provides a comprehensive description of water conservation programs that are employed currently and are planned to be implemented in the future. TODB's water conservation programs are described in accordance with the list of 14 DMMs (A - N) in Table 6-1. For each DMM there is a description of the measure, the schedule for implementation, steps for implementation, methods to evaluate effectiveness and estimated water savings.

TODB is pursuing water conservation programs and DMMs that are economically feasible and appropriate for reducing water demand with a goal to meet the 2020 Water Use Targets defined in Chapter 3. Not all DMMs are planned to be implemented by TODB, but all DMMs were considered by TODB and are discussed. TODB's objective is to implement measures that will have the greatest impact on reducing water consumption within its available financial resources. Notably, TODB is planning an aggressive meter retrofit program, under which 3,738 un-metered

connections will be metered by the end of Fiscal 2017-18. The retrofit program will be a key DMM to meeting the water use targets.

Table 6-1
Demand Management Measures

DMM - A	Water survey programs for single-family residential and multifamily residential customers
Year Implemented - Schedule	Ongoing with updates in 2018 after services are retrofitted with meters
Description	TODB provides residents with free home water use auditing at the request of customers. Services include leak detection assistance, conservation survey of home appliances, recommending repairs, and water use efficiency techniques for landscape practices and irrigation timers. During a home survey, TODB will identify toilets, washing machines and plumbing fixture replacements that could reduce household water use and provide residents with estimated water savings. TODB also discusses use of weather-based irrigation controllers and how to program irrigation timers.
Steps to Implement	Upon request of the customers, TODB conducts the survey. Results are entered into the customer file.
Methods to Evaluate Effectiveness	For metered customers, the effectiveness is evaluated by comparing audited customer's prior use with use after any water savings changes are made.
Estimated Water Savings	Water saving has not been estimated by this program, however up to 10% is anticipated per audited residence depending on the change in practices or repairs.

DMM - B	Residential plumbing retrofit
Year Implemented - Schedule	2017 - 2018 (tentative)
Description	TODB does not currently have a plumbing retrofit program to provide customers with low-flow showerheads or faucet aerator kits that meet WaterSense Specification efficiency standards. TODB is instead putting resources into other rebate programs that can be administered by other agencies due to limited staffing resources (see DMM - I and DMM - N). The decision to implement a plumbing retrofit program will be made following evaluation of effectiveness of other rebate programs and assessment of staff resources. A cost-benefit analysis of a plumbing retrofit program is summarized as follows: EPA Water Sense website indicates the average family could save 700 gallons per year (GPY) by replacing inefficient faucets and 2,900 GPY by replacing inefficient showerheads, with WaterSense labeled models. The minimum cost for a showerhead/faucet kit is approximately $50, which would be offered as a rebate to allow owners to choose their own kit. In addition, a $20 administrative fee is included. Assuming there are 2 kits per “average family”, and each kit has a 10 year lifetime, total water savings is estimated to be 48 CCF per “average family”, which equates to a lifetime cost-benefit of approximately $2.5/CCF. In comparison, the current TODB current water rate $1.51/CCF.
Steps to Implement	Assess effectiveness of other rebate programs, public interest, water savings and staff resources to implement a plumbing retrofit program.
Methods to Evaluate Effectiveness	N/A (will be assessed upon implementation)
Estimated Water Savings	N/A (will be assessed upon implementation and estimated volume)

DMM - C	System water audits, leak detection, and repair
Year Implemented - Schedule	Ongoing with updates in 2018 after services are retrofitted with meters
Description	Currently, TODB visually monitors the system with a focus on areas with older pipelines and immediately repairs any leaks that are visually identified. Current estimates of water system unaccounted losses range from 7-12% of total production, which are attributed to pipe breaks, pipe leakage and flushing programs. Whenever pipe leaks are identified and repaired, TODB documents and keeps a record of the pipe material, condition and location to identify areas of higher failure probability, which are used in developing and updating the pipe replacement programs. TODB will expand the system water audit capabilities after the meter retrofit program (see DMM – D), which is planned to be completed by the end of FY 2017-18. Several pipe replacement programs are planned by 2020 to improve fireflows and reduce leakage.
Steps to Implement	Monitor areas of higher leak frequency, update pipe replacement program as warranted by leak frequency and cause. Update water auditing capability after all services are retrofitted with meters (planned by 2017).
Methods to Evaluate Effectiveness	The effectiveness will be evaluated by tracking leak detection and repair and comparing prior water use with water use after repairs are made.
Estimated Water Savings	Water losses are approximately 7-12% of annual production. It is estimated that the leak detection program will improve water losses to approximately 6% of annual production based on quantity of mainlines planned to be replaced.

DMM - D	Metering with commodity rates for all new connections and retrofit of existing connections
Year Implemented - Schedule	Partially started in 2008, to be reinitiated in 2015 and completed by 2018.
Description	TODB's program for metering with commodity rates is implemented for commercial and landscape accounts. TODB requires all new services be installed with a meter. TODB began retrofitting existing residential meters in 2008. Currently, approximately 3,738 services are un-metered (64% of all services). TODB's objective is to implement metering with commodity rates of all services, starting with a meter retrofit program that will begin in July 2015 and ending in June 2018. The metering with commodity rates consists of: require meters on new services; establish a program to retrofit meters on unmetered services; read meters and bill on volume use; bill bi-monthly or more frequently; establish a program to test, repair and/or replace meters; consider splitting mixed-use commercial and landscape meters to have a dedicated landscape meter.
Steps to Implement	Retrofit un-metered connections over a three year implementation beginning FY 2015-16 and ending FY 2017-18. Develop commodity rates.
Methods to Evaluate Effectiveness	Effectiveness will be measured by comparing prior water deliveries to future water deliveries.
Estimated Water Savings	Savings cannot be measure yet; however, the CUWCC reports a savings of 20% can be realized by retrofitting un-metered services. This DMM is integral to meeting the 2020 Water Use Target discussed in Chapter 3, in addition to a water use offset from the WWTP Recycled Water Project (see Chapters 3 and 4).

DMM – E	Large landscape conservation programs and incentives
Year Implemented - Schedule	2015 - 2016
Description	Most Home Owners Associations (HOA) in the service area utilize weather-based landscape irrigation controllers in common landscape areas, and TODB has installed weather-based controllers on other large landscape irrigation services (such as parks and common area landscapes not maintained by private HOA's). TODB has identified the remaining large landscape services that do not have weather based controllers. TODB has not conducted ETO-based water use budgets for common landscape areas nor has it developed an incentives program to replace existing landscaping with low-water use planting.
Steps to Implement	Involve remaining HOAs and TODB properties in implementing weather-based landscape irrigation controllers.
Methods to Evaluate Effectiveness	Effectiveness cannot be evaluated on existing services that already have weather based landscape irrigation controllers. New retrofits will be evaluated by comparing prior water use to future water use after the retrofits are made.
Estimated Water Savings	Retrofitting systems with weather-based controllers will reduce landscape consumption, the amount is unknown.

DMM – F	High-efficiency washing machine rebate programs
Year Implemented - Schedule	2016 - 2017
Description	TODB is planning to implement incentive-based (i.e. rebate) programs. For the first year of implementation, TODB is budgeting $15,000 in rebate programs and will assess effectiveness and public interest in these programs for continued budgets. For High-Efficiency washing machine rebate programs, TODB is going to participate in the co-op PG&E Clothes Water Program. PG&E and Bay Area water agencies partner to provide customers a combined rebate for the purchase of an efficient clothes washer. The current offer is a $150 rebate on Energy Star Most Efficient Clothes Washers. Water agencies provide $100 per rebate and PG&E provides $50 per rebate. The program is administered by PG&E. Customers will be notified that the rebates will be available starting in 2016. PG&E has indicated the program will end December 31, 2016.
Steps to Implement	TODB Board needs to approve the rebate program budget. TODB staff will then sign up with the PG&E Clothes Washer Program. Customers will purchase the eligible machines and apply for rebates through PG&E. PG&E will confirm the eligible customers with TODB and bill TODB monthly for all rebates processed (plus $10 administrative fee per rebate).
Methods to Evaluate Effectiveness	Volume of customers that utilize rebates will indicate water savings (assuming the old washing machine being replaced is not current Energy Start Most Efficient).
Estimated Water Savings	Estimated water savings is 3,000 gallons per year per rebate. Source: Energy Star Most Efficient website indicates the certified clothes washers use 13 gallons of water per load, compared to 23 gallons used by a standard machine, and estimated annual savings is 3,000 gallons per year.

DMM - G	Public information programs
Year Implemented - Schedule	2008 - ongoing
Description	TODB has an ongoing public information program to promote water conservation by informing customers about the needs and benefits of water conservation. The public information program generally consists of the following methods for disseminating information: providing customers with bill inserts; using paid public advertising; providing information via a link on the TODB website (www.saveourh20.org); providing year-to-year comparisons in customer water bills (for those that are metered); sending out a newsletter twice per year; and, a portable digital message board that is moved throughout town to display water conservation messages and information. The digital message board is used to display reminders about conservation and setting irrigation timers during summer months, and reminders about water use prohibitions during droughts or water shortages. TODB recognizes that social marketing and attitude behavior are important factors in reducing water consumption. As a result, messaging and public information will need to be continually updated based on public input and staff training in water conservation techniques. TODB also seeks to improve targeted messaging, such as identifying and contacting the residents in pre-1992 homes that could benefit most from specific plumbing upgrades. Furthermore, with the retrofit of all un-metered connections, TODB will improve the targeted messaging by including information and comparison of water use for each resident.
Steps to Implement	Continue to update customers on water conservation activities and improve targeted messaging via the TODB website and the other forms discussed above.
Methods to Evaluate Effectiveness	Savings cannot be directly quantified.
Estimated Water Savings	Though it cannot be quantified, these programs likely have already reduced annual water consumption and will continue to do so with increasing public awareness.

DMM – H	School education programs
Year Implemented - Schedule	2016 – ongoing thereafter
Description	TODB intends to develop an education program with local school districts in the service area to provide instructional assistance and educational materials. The education program will involve explaining how water is acquired, stored and treated for consumption and specifically where the local water supplies comes from and environmental issues. The materials will be developed in coordination with teachers to meet state educational framework and grade-appropriate materials. It will start with meeting with teachers and school administration and educating the teachers on this subject. TODB will work with teachers to develop booklets and conservation-related handouts for the students. TODB may also provide presentations to students or participate in science fairs.
Steps to Implement	Hold workshops with local school administration and teaching staff. Develop grade-appropriate material.
Methods to Evaluate Effectiveness	Future savings cannot be directly quantified.
Estimated Water Savings	Future savings cannot be directly quantified.

DMM - I	Conservation programs for commercial, industrial, and institutional accounts
Year Implemented - Schedule	2016 - 2017
Description	TODB is planning to implement incentive-based (i.e. rebate) programs. For the first year of implementation, TODB is budgeting $15,000 in rebate programs and will assess effectiveness and public interest in these programs for continued budgets. TODB will target commercial/institutional accounts with a commercial toilet replacement rebate program. TODB is going through the Smart Rebate program administered by CUWCC. TODB will sign up for the $200 rebate for commercial toilet replacements. Schools, restaurants and other CI customers will be informed the rebates will be made available starting in 2016.
Steps to Implement	TODB Board needs to approve the rebate program budget. TODB staff will then sign up with the CUWCC Smart Rebate Program and contribute a portion of the budget to be used in the commercial toilet rebates. Customers will purchase the eligible toilets and apply for rebates through CUWCC. CUWCC will confirm the eligible customers with TODB and use the available budget to process the rebate plus an administrative fee.
Methods to Evaluate Effectiveness	Volume of customers that utilize rebates will indicate water savings (assuming the old toilet being replaced is not current WSS standard).
Estimated Water Savings	Estimated water savings is 13,900 gallons per year per rebate. Source: CUWCC Smart Rebate website indicates an average water savings of 38 gallons per day when replacing a commercial non-Ultra Low Flush Toilet with a new High Efficiency Toilet.

DMM - J	Wholesale agency programs
Year Implemented - Schedule	N/A
Description	The district does not have wholesale water exchanges.
Steps to Implement	N/A
Methods to Evaluate Effectiveness	N/A
Estimated Water Savings	N/A

DMM - K	Conservation pricing
Year Implemented - Schedule	June 2018
Description	This measure relates with DMM – D (metering with commodity rates) and focuses on setting a rate structure with a price signal to customers to use water efficiently. In general, conservation pricing models involve setting a commodity rate structure such that a significant portion of the total revenues come from the volumetric billing as compared to the fixed rate charges. However, each agency is unique in how rates are set and professional studies are required to determine the rate case most applicable for each agency. TODB will review the rate case and will implement a conservation pricing element after the metering retrofit program is completed, by 2017. It is unknown if the commodity rate structure will be a uniform rate or a tiered rate structure.
Steps to Implement	Complete the meter retrofit program. Conduct a rate study and hold public meetings to determine the new rate structure.
Methods to Evaluate Effectiveness	The effectiveness of this DMM will be evaluated during the rate study and then assessed after it is implemented by measuring water savings before and after the meter retrofit and rate structure changes.
Estimated Water Savings	The water savings for this DMM is part of the water reduction estimated for the meter retrofit program (DMM – D).

DMM – L	Water conservation coordinator
Year Implemented - Schedule	2015 - Ongoing
Description	TODB has designated a staff member to be responsible for coordinating water conservation program management, tracking, planning and reporting on the DMM implementation. The designated water conservation coordinator is the Water and Wastewater Manager.
Steps to Implement	The water conservation coordinator works with other staff, customers and stakeholders to implement the water conservation program.
Methods to Evaluate Effectiveness	Water savings cannot be directly measured. It is
Estimated Water Savings	Water savings cannot be directly measured.

DMM - M	Water waste prohibition
Year Implemented - Schedule	2014 - Ongoing
Description	On September 3, 2014, TODB enacted an ordinance on waste prohibition and assess fines for repeat offenders (Ordinance No. 25 Establishing Emergency Drought Regulations, see Appendix C). TODB has also established the Water Shortage Contingency Plan in this 2010 UWMP (Chapter 5) that defines further prohibitions to be implemented in the event of a water shortage emergency affecting TODB supply wells by up to a 50% reduction. TODB is considering implementing a landscape ordinance based on the State issued Model Water Efficient Landscape Ordinance (MWELO) that would require landscape permit, plan check, or design review for new and rehabilitated landscape areas that exceed a minimum square footage.
Steps to Implement	During a water shortage emergency, waste prohibitions are declared by the Board of Directors and administered, implemented and enforced by the General Manager.
Methods to Evaluate Effectiveness	Water savings would be assessed during a water shortage emergency based on tracking total production and individual metered accounts.
Estimated Water Savings	Implementing prohibitions will save water from 0-50% when the prohibitions are enforced during a water shortage emergency. (see Chapter 5)

DMM - N	Residential ultra-low-flush toilet replacement programs
Year Implemented - Schedule	2016-2017
Description	TODB is planning to implement an incentive-based (i.e. rebate) programs. For the first year of implementation, TODB is budgeting $15,000 in rebate programs and will assess effectiveness and public interest in these programs for continued budgets. For residential toilet replacements, TODB is going through the Smart Rebate program administered by CUWCC. TODB will sign up for the $100 rebate for residential toilet replacements. Residential customers will be informed the rebates will be made available starting in 2016.
Steps to Implement	TODB Board needs to approve the rebate program budget. TODB staff will then sign up with the CUWCC Smart Rebate Program and contribute a portion of the budget to be used in the residential toilet rebates. Customers will purchase the eligible toilets and apply for rebates through CUWCC. CUWCC will confirm the eligible customers with TODB and use the available budget to process the rebate plus an administrative fee.
Methods to Evaluate Effectiveness	Volume of customers that utilize rebates will indicate water savings (assuming the old toilet being replaced is not current WSS standard).
Estimated Water Savings	Estimated water savings is 6,500 gallons per year per rebate. Source: EPA WaterSense website indicates 13,000 gallons of water savings per year for an average family that replaces inefficient toilets with WaterSense labeled models. Assume there are 2 toilets for “average family”.

Appendix A

UWMP Checklist

Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 1.2
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1.2 Section 1.3
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Section 1.3
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Section 1.3
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Section 1.2
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Section 1.3
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Section 1.3
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Section 1.3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 1.3
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1.3
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Section 2.1 Section 2.2
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Section 2.3
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.4
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.4
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.4
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 3.1 Section 3.2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 1.3
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	(form not yet available)	Section 3.2
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.3 Section 3.4 Section 3.7 Section 3.8
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Not Applicable (Section 3.6)
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Section 3.5
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Section 4.1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 4.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Section 4.2
16	Describe the groundwater basin.	10631(b)(2)		Section 4.2
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Section 4.1
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate "not applicable" in the UWMP location column.	10631(b)(2)		Not Applicable (Section 4.2)
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate "not applicable" in the UWMP location column.	10631(b)(2)		Section 4.1
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Section 4.2.4
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Section 4.2.4
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Not Applicable (Section 4.3)
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Not Applicable (Section 4.6)
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Not Applicable (Section 4.4)

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Section 4.5
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 4.5.1
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Section 4.5.2
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Section 4.5.3
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 4.5.3
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Section 4.5.3
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 4.5.4
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Section 4.5.5
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 6.1
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Section 5.4

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Section 5.1
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Section 5.2
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Section 5.4.2
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Section 5.2.6
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 5.2.2
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 5.2.3
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 5.2.4
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 5.2.5
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Appendix C.1
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 5.4.3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 5.3
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 5.4.4
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6.2
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 6.2
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Section 6.2
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Section 6.2
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Not Applicable (Section 6.1)

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Appendix B

Coordination and Adoption: Notices to Agencies of Public Hearing, Resolution to Adopt UWMP

(NOT INCLUDED IN DRAFT)

Appendix C

Water Conservation Ordinances

C.1 Draft Water Shortage Contingency Resolution

C.2 Resolution 2014-11 - Voluntary Water Reduction

C.3 Ordinance No.25 – Establishing Emergency Drought Regulations

Appendix C.1

TOWN OF DISCOVERY BAY
COMMUNITY SERVICES DISTRICT

RESOLUTION _____

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TOWN OF DISCOVERY BAY, A CALIFORNIA COMMUNITY SERVICES DISTRICT, ON THE IMPLEMENTATION OF STAGE [II, III, OR IV] OF THE WATER SHORTAGE CONTINGENCY PLAN AS OUTLINED IN THE 2010 URBAN WATER MANAGEMENT PLAN ON FILE WITH THE CALIFORNIA DEPARTMENT OF WATER RESOURCES

WHEREAS, on [DATE], by Resolution _____, The Board of Directors of the Town of Discovery Bay Community Services District approved the 2010 Urban Water Management Plan; and

WHEREAS, the 2010 Urban Water Management Plan includes the Water Shortage Contingency Plan; and

WHEREAS, based on the [describe water supply shortage condition caused by drought or loss of water supply wells] the Board of Directors of the Town of Discovery Bay Community Services District hereby declares that a water shortage emergency condition prevails within the water service area of the Town of Discovery Bay and that water use within the Town of Discovery Bay should be reduced by up to [15, 35 or 50] percent; and

WHEREAS, required water use reduction described above necessitates implementation of Stage [II, III, or IV] of the Town of Discovery Bay's Water Shortage Contingency Plan. The water conservation measures and water use restrictions for Stage [II, III or IV] are described in the attached Water Shortage Contingency Plan. Implementation of Stage [II, III or IV] shall be cumulative and shall include implementation of all previous provisions listed in Stages [I, II, or III]; and

WHEREAS, the General Manager is hereby authorized and empowered to delegate his or her authority hereunder to such assistants, deputies, officers, employees, or agents of the Town as he or she shall designate, and to establish such rules, regulations and procedures, and to prepare or furnish such forms, as he or she deems necessary or appropriate to carry out the provisions of the Resolution; and

WHEREAS, this Resolution shall be effective upon its adoption, and shall remain effective until the water shortage conditions are resolved, in which case this Resolution shall be rescinded, or until conditions worsen, thus requiring additional action by the Board of Directors, in which case a subsequent Resolution will be considered for adoption.

NOW, THEREFORE BE IT RESOLVED by the Board of Directors of the Town of Discovery Bay that Stage [II, III, or IV] of the Water Shortage Contingency Plan is hereby adopted.

PASSED, APPROVED AND ADOPTED THIS [day] DAY OF [month], [year] by the following vote:

Water Shortage Contingency Plan

Table of Contents

Section 1 Stages of Action
Section 2 Prohibitions
Section 3 Consumption Reduction Methods
Section 4 Penalties
Section 5 Revenue and Expenditure Impacts During Water Shortages
Section 6 Other Actions During Catastrophic Reductions

List of Tables

1. Rationing Stages to address water Supply Shortages
2. Mandatory Prohibitions
3. Proposed Consumption Reduction Methods
4. Penalties and Charges

Attachments

1. Resolution 2014-11 – Voluntary Water Reduction (Appendix C.2)
2. Ordinance No. 25 Establishing Emergency Drought Regulations (Appendix C.3)

This document outlines stages of actions that will be implemented by TODB in the event of water supply shortages and emergency preparedness and plans for catastrophic events. The purpose of this contingency plan is to provide a plan of action to be followed at the various stages of a water shortage. A copy of TODB's current water reduction ordinances and resolutions, are in Appendix C.2 and C.3.

Section 1 Stages of Action

CWC Section 10632 (a) requires stages of action to be undertaken by the water supplier in response to water supply shortages, including up to a 50-percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

TODB will implement a four-stage action in response to water supply shortages to comply with State requirements. The stages will be implemented during water supply shortages, or regional drought conditions that may not be directly influencing TODB water supplies. The stage determination and declaration of a water supply shortage will be made by the TODB Board of Directors.

Stage I – This stage is part of an ongoing public information campaign encouraging voluntary water conservation. TODB issued a resolution for voluntary water use in *Resolution 2014-11 – Voluntary Water Reduction* (Appendix C.2). There is little to no water shortage during Stage 1. Although Stage I is ongoing, customers are reminded when a regional single-year drought is occurring , or when TODB has a redundant back-up well offline for repairs, which makes the overall supply system more vulnerable to shortages.

Stage II – This stage would be initiated during moderate water shortage (of up to 15%) and would be the first stage where mandatory conservation and water use prohibitions are enforced. Failure of two groundwater supply wells could cause a moderate reduction in water supply resulting in implementation of Stage II. Stage II would also be implemented during a regional severe drought where water conservation is mandatory but impacts to TODB's groundwater supply wells are negligible or non-existent. During Stage II the Board of Directors will declare prohibitions on water use, in accordance with the TODB *Ordinance No. 25 Establishing Emergency Drought Regulations* (Appendix C.3).

Stage III – This stage would be initiated during a severe water shortage (15 to 35%), which could be caused by a catastrophic failure of up to three groundwater supply wells. During Stage III, the Board of Directors would adopt a new ordinance providing authority for the General Manager to implement additional prohibitions and consumption reduction methods that would include water rationing if other consumption reduction methods are not effective at reducing demand.

Stage IV – This stage would be initiated during a critical water shortage (35 to 50%), which could be caused by a catastrophic failure of more than three groundwater supply wells. All steps taken in the prior stages would be intensified and production would be monitored daily for compliance with necessary reductions. Residents would be under water rationing. TODB would be in emergency status to repair and bring online water supply wells.

Table 1 lists the four stages of action for the water shortage contingency.

Table 1
Rationing Stages to Address Water Supply Shortages

Stage No.	Water Supply Conditions	% Shortage
I - Voluntary	Normal to Minimum – Ex: loss of a redundant well supply	0-5%
II – Mandatory Conservation	Moderate – Ex: Severe drought *or* catastrophic loss of 2 wells	0-15%
III - Rationing	Severe to Critical – Ex: Catastrophic loss of 3 wells	15-35%
IV – Intense Rationing	Severe to Critical – Ex: Catastrophic loss of 3 or more wells	35-50%

Section 2 Prohibitions

The CWC Section 10632 (d) requires water suppliers to implement mandatory prohibitions against specific water use practices that may be considered excessive during water shortages. If drought conditions or water shortages warrant mandatory prohibitions (Stage II) TODB will implement the current water shortage emergency response plan, *Ordinance No. 25 Establishing Emergency Drought Regulations* (Appendix C.3). Further mandatory prohibitions will be implemented if warranted based on Stage III or Stage IV conditions. Table 2 identifies potential prohibitions that would be enforced during a water shortage emergency.

Table 2 Mandatory Prohibitions	
Prohibitions	**Stage When Prohibition Becomes Mandatory**
Excessive outdoor watering (causing runoff to non-irrigated areas)	II, III, IV
Use of hose without a shut-off nozzle for vehicle washing	II, III, IV
Application of water to driveways or sidewalks	II, III, IV
Use of water in non-circulating fountain or water feature	II, III, IV
Outdoor irrigation beyond the allowed watering schedule	II, III, IV
Uncorrected plumbing leaks	III, IV
Washing cars	III, IV
Watering lawns/landscapes or filling outdoor water features	III, IV

Section 3 Consumption Reduction Methods

CWC Section 10632 (e) requires the water supplier to implement consumption-reduction methods during the most severe stages of water shortage that are capable of reducing water use by up to 50%. TODB would implement the water consumption–reduction methods shown on Table 3, below. Some of the methods are on-going and are part of the TODB water conservation efforts addressed in the Demand Management Measures.

Table 3 Proposed Consumption Reduction Methods		
Consumption Reduction Methods	**Stage When Method Takes Effect**	**Projected Reduction (%)**
Demand Reduction Program	All stages	10-20%
Water conservation kits	All stages	10-20%
Education programs	All stages	10-20%
Voluntary rationing	All stages	0-20%
Mandatory prohibitions	II, III, IV	10-20%
Apply flow restrictions to customers	III, IV	35-50%
Water shortage pricing	III, IV	10-50%
Apply penalties for excessive water use	II, III, IV	10-50%
Restrict water use for only priority uses	III, IV	10-50%
Mandatory water rationing, per capita allotment	IV	20-50%

Section 4 Penalties

CWC Section 10632 (f) requires a water supplier to penalize or charge for excessive use, where applicable. In accordance with the TODB Ordinance No. 25, when a water shortage emergency is declared, the General Manager may issue a Notice of Violation to any customer that fails to comply with the conditions of the ordinance. After one notice has been issued further violations shall be punishable by a fine of: $25 for a first violation; $50 for a second violation; $100 for a third violation; and $500 for a fourth violation and any subsequent violation thereafter. Furthermore each day upon which any condition of the ordinance is violated constitutes a separate violation.

During severe and critical water shortages (Stages III and IV), there will be additional charges applied for excessive water use. During these water shortages, the General Manager may take further actions if violations continue after the one written warning, such as installing a flow-restricting device on the service line, or termination of service for repeated violations of unauthorized water use. Table 4 presents the stages during which penalties and charges take effect.

Table 4
Water shortage contingency — penalties and charges

Penalties or Charges	Stage When Penalty Takes Effect
Penalty for excess use	II, III, IV
Charge for excess use	III, IV
Flow Restriction	III, IV
Termination of Service	III, IV

Section 5 Revenue and Expenditure Impacts During Water Shortages

CWC Section 10632 (f) requires an analysis of the impacts of consumption reduction on the revenues and expenditures of the water supplier. TODB will establish an accounting for tracking expenses and revenue shortfalls associated with water conservation and rationing. TODB maintains reserve funds that can be used to offset expenditure impacts during times of emergency. TODB will implement a surcharge to recover unmitigated revenue shortfalls.

Section 6 Other Actions During Catastrophic Reductions

In the event of catastrophic reduction in water supplies, TODB would implement emergency preparedness plans, depending on the cause and severity of the water shortage. California Water Code (CWC) Section 10632 (c) requires certain actions to be undertaken by the water supplier during a catastrophic interruption in water supplies. A catastrophic event resulting in water shortage would be any event, either natural or man-made, with varying levels of severity to the water supply conditions. Examples include, but are not limited to, a regional power outage, an earthquake, or other disasters.

TODB has in place an Emergency Operations Plan that would be implemented by the TODB staff in the event of a catastrophic water shortage. TODB has equipped its facilities with standby emergency generators that would be operated if the catastrophic event involved loss of power. Both of the water treatment plants and booster stations are equipped with permanent emergency generators and automatic transfer switches. TODB owns portable generators that can be used to operate the groundwater pumping stations. If there is catastrophic rupturing of pipelines, during an earthquake for example, the emergency operations procedures would be followed to isolate the damaged sections, notify customers and immediately repair the damage.

TOWN OF DISCOVERY BAY
COMMUNITY SERVICES DISTRICT

RESOLUTION 2014-11

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TOWN OF DISCOVERY BAY, A CALIFORNIA COMMUNITY SERVICES DISTRICT, ENCOURAGING DISCOVERY BAY RESIDENTS TO VOLUNTARILY REDUCE WATER CONSUMPTION BY 20% TO AID IN DROUGHT RELIEF EFFORTS

WHEREAS, Town of Discovery Bay Community Services District has as one of its functions the production, treatment and delivery of potable water for domestic purposes; and

WHEREAS, the State of California is in the midst of a three-year water drought that has severely depleted the reservoirs and lakes necessary to provide continued water supplies to all Californians; and

WHEREAS, on January 17, 2014 California Governor Edmund G. Brown declared a water State of Emergency as California and the West enter yet another year of extreme drought conditions; and

WHEREAS, on April 25, 2014 Governor Brown urged all Californians to reduce water consumption by 20%, and encourages all Californians to visit www.saveourh2o.org to find out how water can be conserved.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE TOWN OF DISCOVERY BAY COMMUNITY SERVICES DISTRICT DOES HEREBY RESOLVE AS FOLLOWS:

SECTION 1. That the Town of Discovery Bay encourages all Discovery Bay water users to voluntarily reduce water consumption by 20% until the time the drought has ended and to visit www.saveourh2o.org to find ways to conserve water.

SECTION 2. The Board Secretary shall certify the adoption of this Resolution.

PASSED, APPROVED AND ADOPTED THIS 4th DAY OF June, 2014.

Mark Simon
Board President

I hereby certify that the foregoing Resolution was duly adopted by the Board of Directors of the Town of Discovery Bay Community Services District at a regularly scheduled meeting, held on June 4, 2014, by the following vote of the Board:

AYES: 5
NOES: Ø
ABSENT: Ø
ABSTAIN: Ø

Richard J. Howard
Board Secretary

TOWN OF DISCOVERY BAY
COMMUNITY SERVICES DISTRICT
ORDINANCE NO. 25

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE TOWN OF DISCOVERY BAY, A CALIFORNIA COMMUNITY SERVICES DISTRICT, ESTABLISHING EMERGENCY DROUGHT REGULATIONS

Be it ordained by the Board of Directors of the Town of Discovery Bay Community Services District as follows:

SECTION 1. Short Title

This Ordinance shall be known and may be cited as Town of Discovery Bay Drought Emergency Regulation Ordinance.

SECTION 2. Purpose

The purpose of this Ordinance is to protect the health, safety, and welfare of residents of the Town of Discovery Bay Community Services District; to respond to the current drought crisis and other possible crises in the future; to authorize the Board of Directors to declare a water shortage emergency; and to regulate water usage with the District for the purpose of conserving severely limited water resources.

SECTION 3. Water Shortage Emergency Declaration

The Board of Directors may declare a water shortage emergency by resolution and upon finding that additional water use restrictions are necessary for the immediate protection of health and safety or are required by State law.

A water shortage emergency declaration shall remain in effect until the Board of Directors finds and declares by resolution that the water shortage emergency condition has abated, has changed in degree, or no longer exists.

SECTION 4. Regulations

While a water shortage emergency declaration is in effect, the following activities shall be prohibited except where necessary to address an immediate health and safety need:

1. The application of potable water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures;

2. The use of a hose that dispenses potable water to wash a motor vehicle except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use;

3. The application of potable water to driveways and sidewalks;

4. The use of potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system;

5. Outdoor irrigation of lawns, ornamental landscapes, or turf with potable water, except as follows:

    a. Dwellings or establishments with odd numbered street addresses may use outdoor water before 1 p.m. and after 7 p.m. on Wednesdays and Sundays only;

b. Dwellings or establishments with even numbered street addresses may use outdoor water before 1p.m. and after 7 p.m. on Tuesdays and Saturdays only.

c. All dwellings, establishments, businesses, associations, parks or open spaces that are connected to an outdoor irrigation system which provides outdoor irrigation to multiple addresses, units and/or areas with or without an address may use outdoor water not more than two days per week for each zone or area controlled by that irrigation system.

SECTION 5. Enforcement

The General Manager of the District shall administer, implement and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the General Manager may be delegated by the General Manager to persons acting in the beneficial interest of or in the employ of the District.

SECTION 6. Violation

The General Manager, or his/her designee, may issue a Notice of Violation to any person, business, association, or other party who fails to comply with any condition of this Ordinance. Failure to comply with any condition of this Ordinance after the issuance of a Notice of Violation shall be punishable by a fine of $25 for a first violation, a fine of $50 for a second violation, a fine of $100 for a third violation, and a fine of $500 for a fourth violation and any subsequent violation thereafter. Each day upon which any condition of this Ordinance is violated shall constitute a separate violation.

Any use or activity in violation of the terms of this Ordinance is declared to be a nuisance per se, and may be abated by order of any court of competent jurisdiction. The District Board, in addition to other remedies, may institute any appropriate action or proceedings to prevent, abate, or restrain the violation. All costs, fees and expenses in connection with such action shall be assessed as damages against the violation.

SECTION 7. Severability

The various parts, paragraphs, section, and clauses of this Ordinance are declared to be severable. If any part, sentence, paragraph, section, or clause is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of the Ordinance shall not be affected.

SECTION 8. Adoption and Effective Date

This Ordinance is hereby declared to have been adopted by the District Board at a meeting thereof duly called and held on the 3rd day of September, 2014, and ordered to be given effect thirty (30) days after its first publication as mandated by statute.

CERTIFICATION

Passed and adopted at a regular meeting of the Board of Directors of the Town of Discovery Bay Community Services District held on September 3, 2014 by the following vote:

Mark Simon
Board President

AYES: 5
NOES: 0
ABSENT: 0
ABSTAIN: 0

Richard J. Howard
Board Secretary